Telephony.

VOLUME VIII.
NUMBER 6.

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SEE PAGE 3 IMPORTANT DECISION PAGE 3

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THE APPELLATE COURT

which is the court of last appeals has decided that the

Fisk Patent is Valid and Basic.

This patent covers all forms of switchboards on which the drops are restored automatically by the insertion of the plug in the spring jack. To make our guarantee give

Absolute Protection to Users of Chicago Apparatus

we have secured a perpetual and non-revokable license from the owners of the Fisk Patent to manufacture and sell self-restoring drops.

The decision of the court is so broad and far reaching that *purchasers of switchboards must have the protection license to be free from the danger of suit for infringement.*

Use Chicago Apparatus
Don't Buy a Lawsuit.

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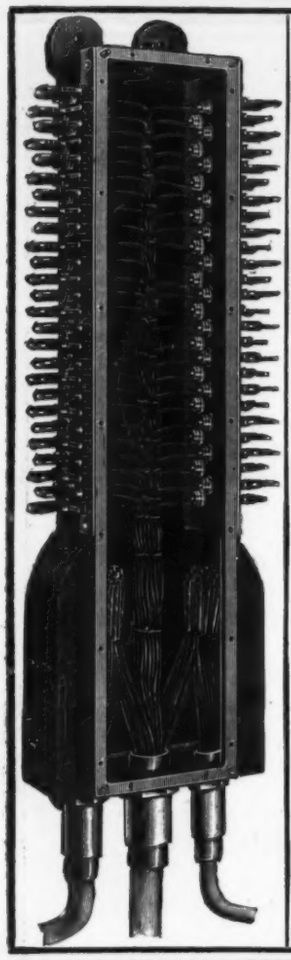

Moon Combination Terminal Head and Junction Box

NEW—PRACTICAL—ECONOMICAL

Used to combine or distribute cable in rearranginging old lines or adding new ones or in multiple distribution. Saves all outside splices and simplifies the work of installing cable. Affords ample room for splicing in an easy manner.

Has Fuse and Carbon Protection
Self-Soldering Nozzles
Metal Outer Case or Pole Box

Made with two or more nozzles for cables up to 200 pair or larger. The Self-Soldering Nozzles make it practical. :: Prices are practical, too.

MOON MANUFACTURING CO.
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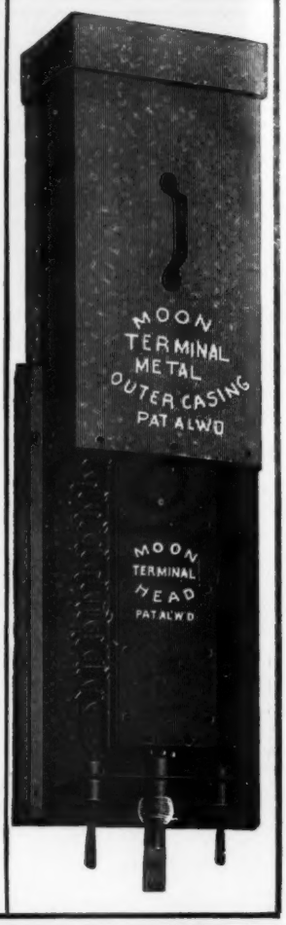

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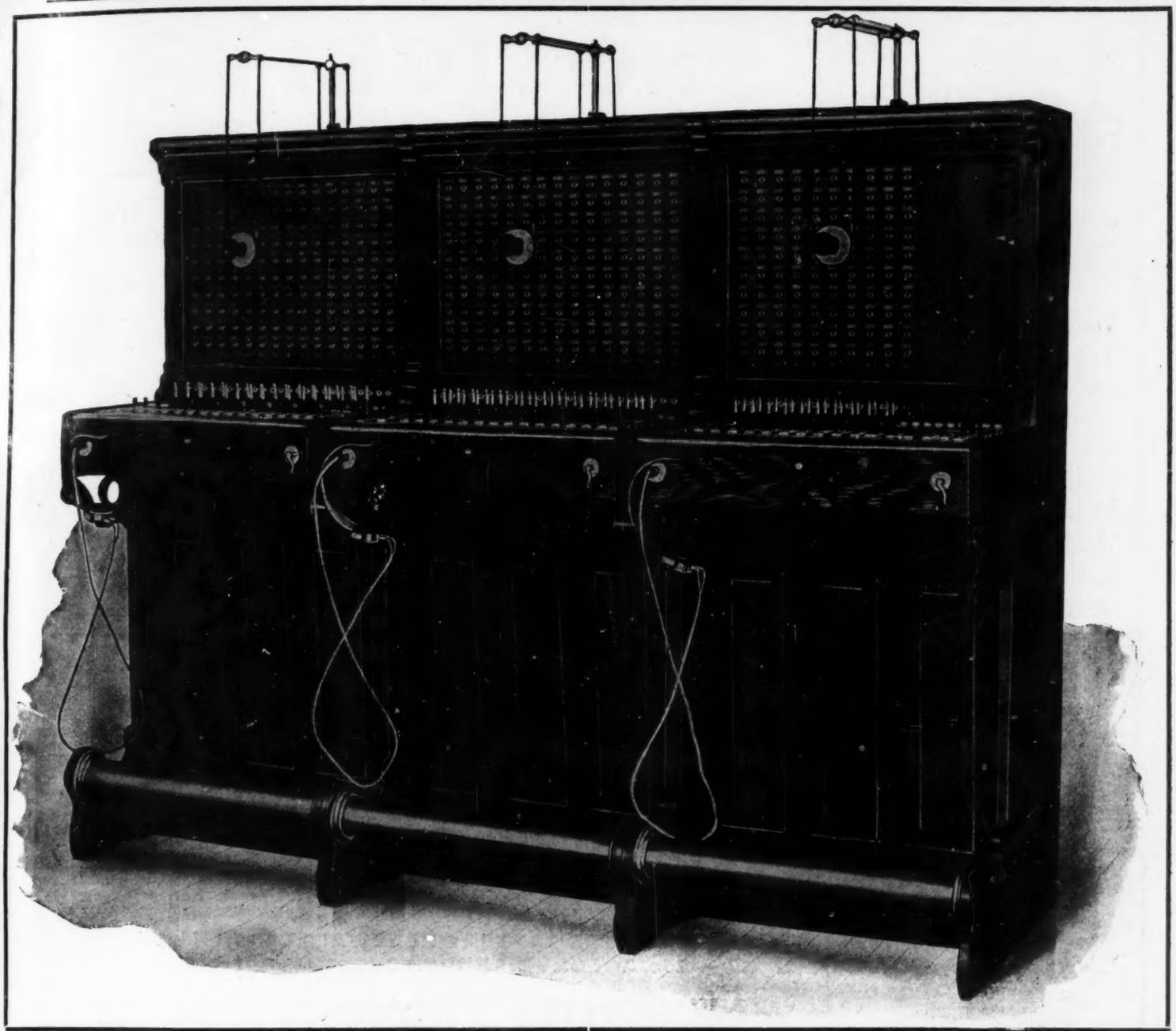

Chicago Bell Type Express Switchboard with Lamp Transfer System.

Cabinet Capacity, 450 Lines
Transfer Capacity, 750 Lines
Installed, - - 400 Lines

As Indestructible as a Plow.
As Finely Finished as a Piano.
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CHICAGO TELEPHONES SATISFY

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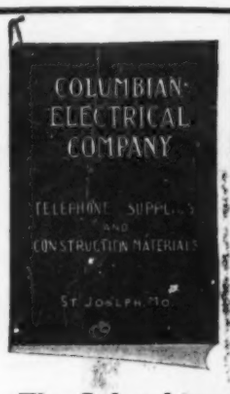

The Columbian Telephones and Switchboards are Installed in some of the largest Exchanges in the West. They are giving perfect satisfaction.

NOTICE!

We Want You to Send for One of Our New Telephone Catalogs.

Our stock rooms are replete with standard supplies of all kinds. We handle only the best material that money can purchase, and are always in position to fill orders promptly at the lowest prevailing market prices. We endeavor to ship goods same day orders are received. Our various departments are in charge of competent men. Our aim is to merit any confidence our patrons may repose in us.

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DRY BATTERY OUTFIT COMPLETE.

SAVES { TIME. MONEY. NERVES. **RESULTS** { BETTER SERVICE. SATISFIED CUSTOMERS. INCREASED BUSINESS.

COST FOR BATTERY RENEWALS LESS THAN 25c A MONTH PER 100 SUBSCRIBERS. . . . .

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Entirely Automatic. Requires Absolutely No Attention.

GUARANTEED TO DO ALL YOUR RINGING UNDER ANY AND ALL CONDITIONS.

We are furnishing this Generator for selective signaling, producing pulsating current, on all orders now.

CAN RING THROUGH 500,000 OHMS, IF NECESSARY.

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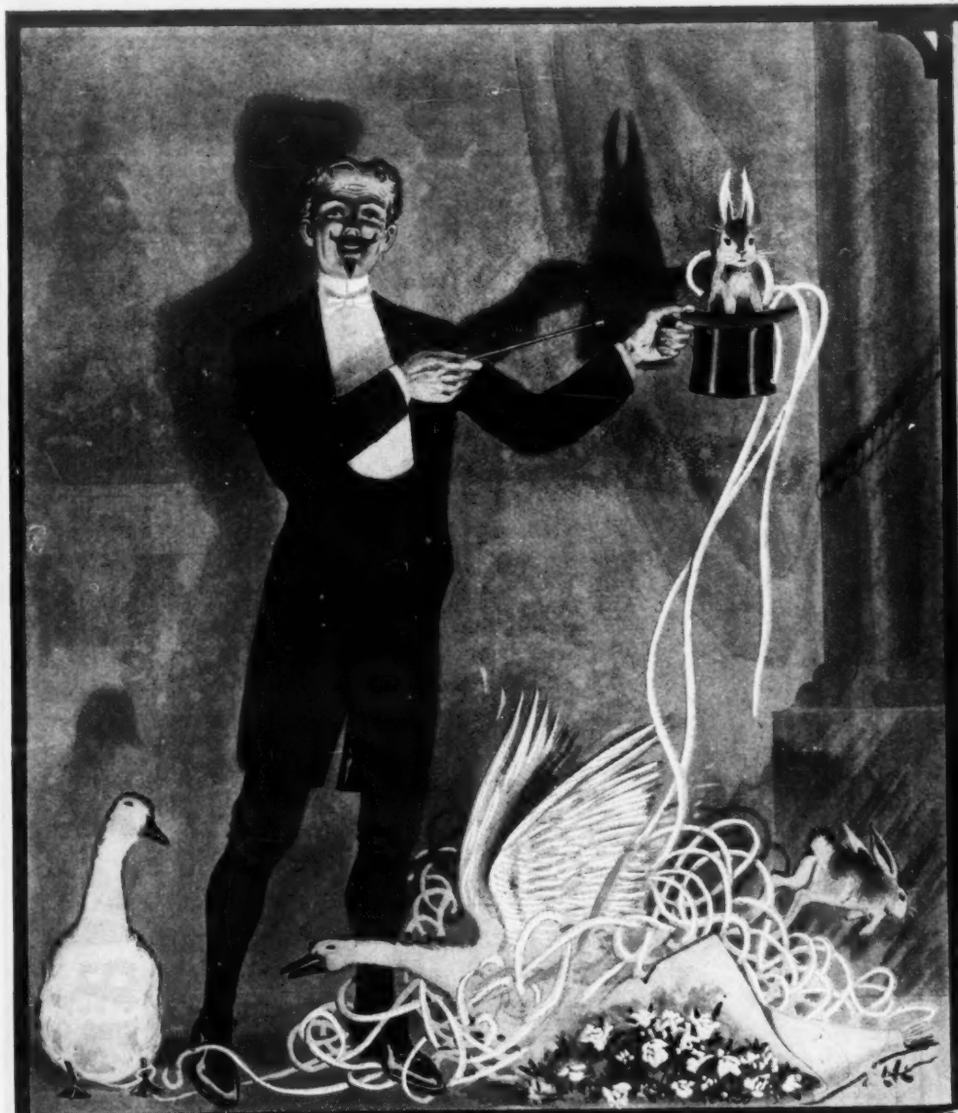

The magician takes ducks and flowers from a borrowed hat, NOT BECAUSE he can work miracles, BUT BECAUSE he has practiced and has become proficient in the trick.

THE HOLTZER-CABOT ELECTRIC CO. CHICAGO, ILL.

We manufacture telephone generators of unapproachable quality, NOT BECAUSE we have different tools or material, BUT BECAUSE we have had long experience and have become proficient in the art.

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HOLTZER-CABOT ELECTRIC CO.

BROOKLINE
NEW YORK
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No! It couldn't if you were using our Pneumatic Telephone Receiver Cushion.

Send for one, you need it, price 50 cents each.

Interior Telephone
"Monarch" W. P. Iron
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Galvanized Messenger
} **WIRE**

All are carried in stock by

MONARCH ELECTRIC & WIRE CO.

125-127 S. Clinton Street, Chicago, Ill.

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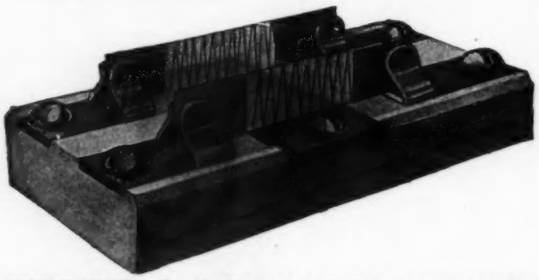
Construction Material. Large and Varied Stock. Prompt Shipment.



Telephone Instruments and Switch Boards

SAMPLE FREE. Any Exchange or Toll Line requesting sample fuse block may have one single or double line block mailed **ABSOLUTELY FREE.**

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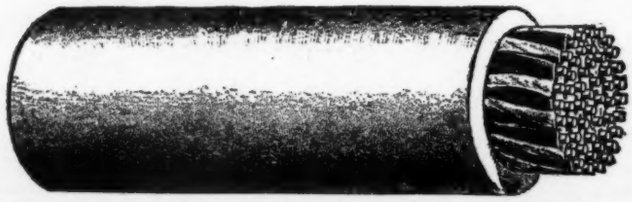

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The Most Powerful Bridging Telephone on the Market.
Get Our Prices Before Placing Orders.

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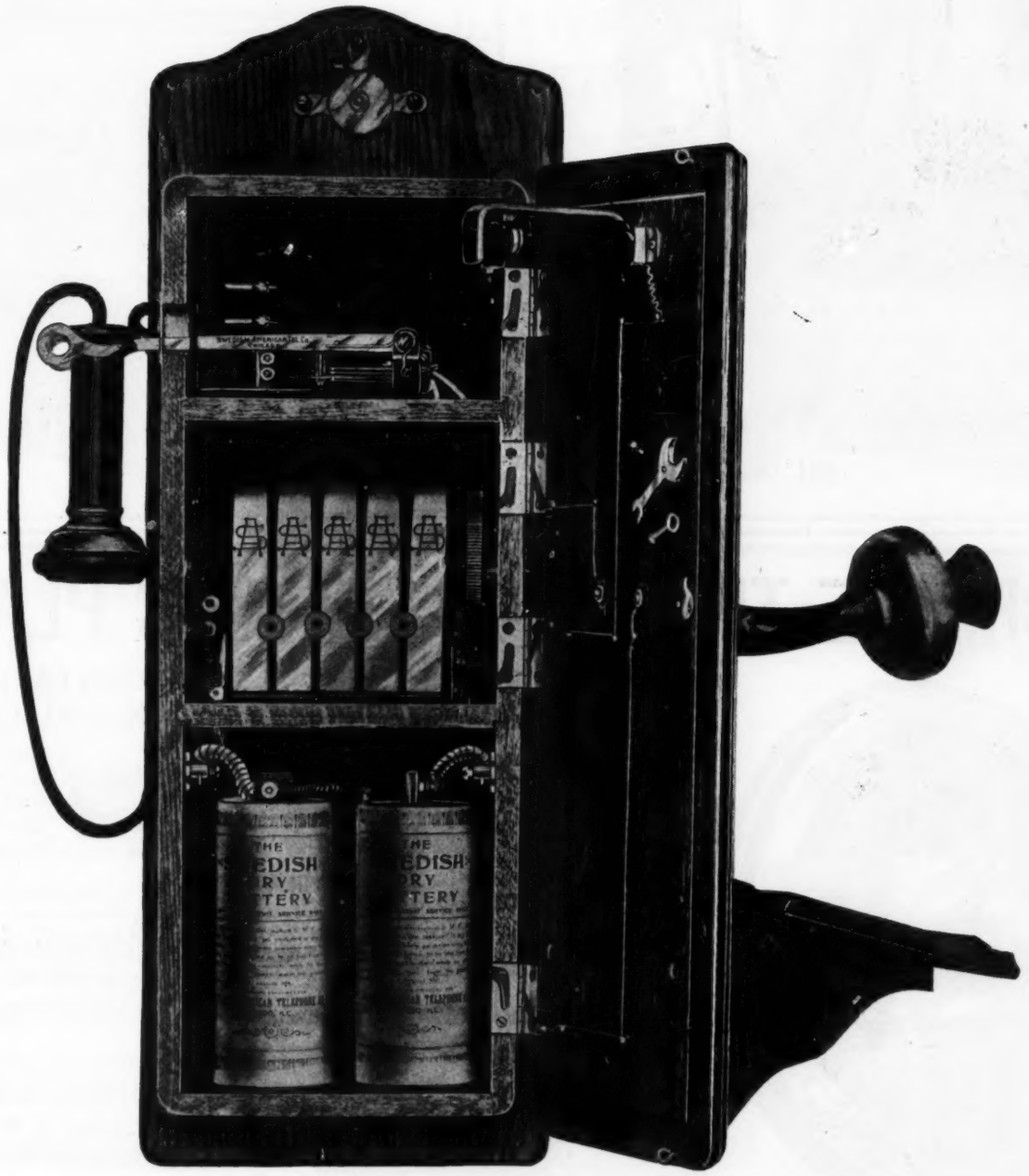

QUALITY

No. 99.

Swedish-American Telephone Company

Chicago

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By Installing the Adjustaphone

No. 5 For Flat Top Desk
(Suitable brackets for roll top desk and for wall are also furnished.)

Exchange Managers are cutting out that abnormal desk set maintenance cost.

To those who have not yet purchased we offer to send one or more **Adjustaphones** on 30 days free trial subject to return at our expense if not found entirely satisfactory.

We furnish the **Adjustaphone** for any system either complete or without transmitter, receiver, etc.

Write for prices.

Chicago Writing Machine Co., Manfrs.

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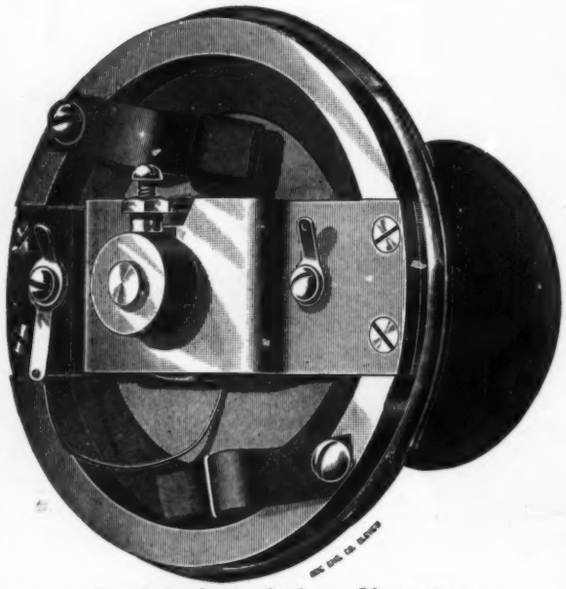
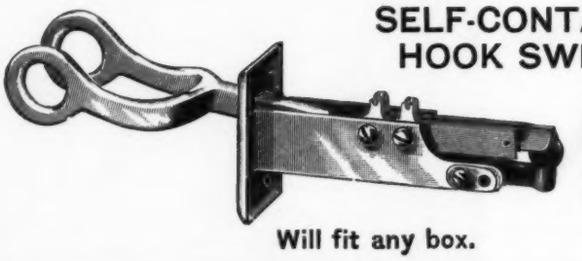


Perfect Articulation, Clearness and Volume

SELF-CONTAINED HOOK SWITCH



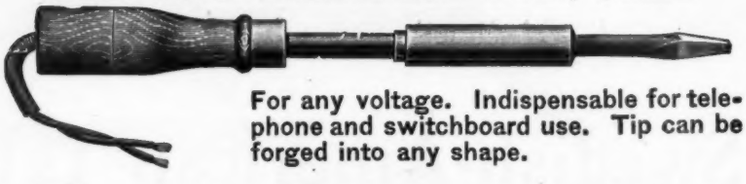
Self-Contained, Self-Cleaning Hook Switch

Will fit any box.

OUR NEW TRANSMITTER SENT GRATIS FOR TRIAL

THE ACKNOWLEDGED STANDARD EVERYWHERE

ELECTRIC SOLDERING IRON, $3.50



For any voltage. Indispensable for telephone and switchboard use. Tip can be forged into any shape.

The Williams-Abbott Electric Co.

8-10-12 Columbus St.
CLEVELAND, OHIO

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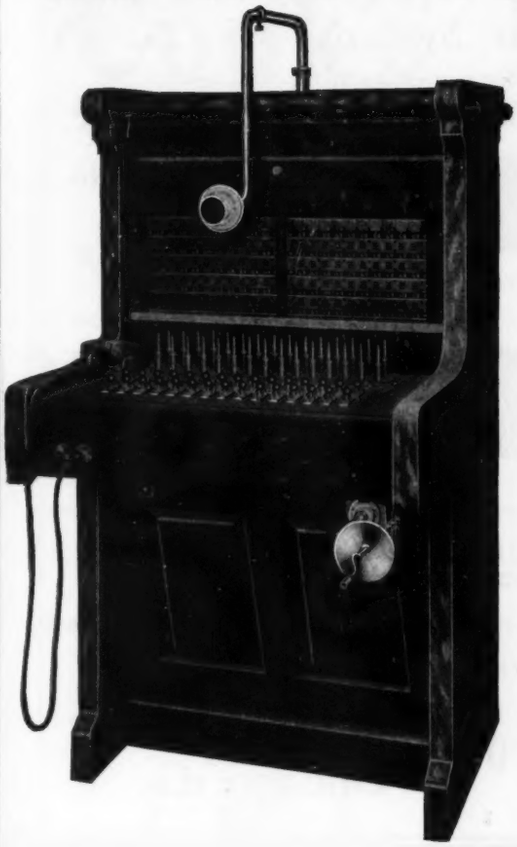
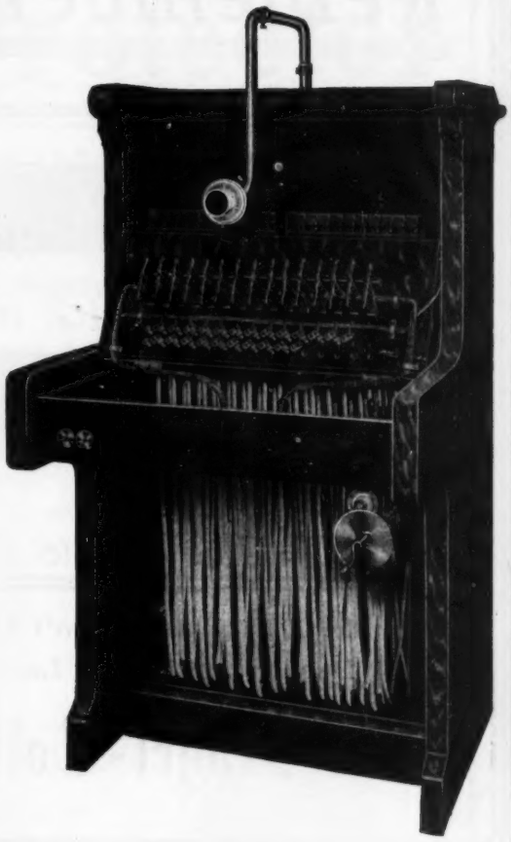
CENTURY—100% GOOD—CENTURY



TELEPHONES AND SWITCH-BOARDS COMMON BATTERY-MAGNETO

If you have never used Century Apparatus you don't know what really good Telephone Apparatus is.



The Highest Degree of Perfection in Mechanical and Electrical Construction Has Been Reached in Century Telephones and Switchboards.

The Best Ideas

and the Best Materials

combined with the Best Workmanship

produces the Best Telephone Apparatus

WRITE FOR DETAILS OF THIS SWITCHBOARD

Catalogue on request.

CENTURY TELEPHONE CONSTRUCTION CO.

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BUFFALO, N. Y.

FACTORY AND WAREHOUSE
481-489 WASHINGTON STREET

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Remember

That it is the detail that may make or break your System ✕ ✕ ✕

The wise buyer looks well into the merit of the small things that go to make up his exchange.

DON'T FAIL to Post Yourself Thoroughly on FUSES

We make a Fuse that Don't Fall to Pieces. Will Stand the Weather in Any Climate.
Being Used by the Largest Telephone Companies in the United States.

The Nagel-Collins Mfg. Co. (NOT INCORPORATED) **249-251 SO. JEFFERSON STREET CHICAGO, ILL.**

NOTICE

Public notice is given that the license to manufacture under the patents of the Rolfe Electric Company, heretofore held by the American Electric Fuse Company of Chicago, has been, and is, revoked, and said Fuse Company is no longer authorized to manufacture any of the protective devices or apparatus invented or owned by Charles A. Rolfe, or the Rolfe Electric Company, and any corporation, firm or individual purchasing self-soldering heat-coils or other devices covered by our patents from any one other than Frank B. Cook or his agents, render themselves liable to suit for infringement of patent.

Frank B. Cook, No. 240 W. Lake St., Chicago, now has an exclusive license to manufacture and sell all circuit protecting devices and apparatus covered by our patents and applications for patents, as well as any devices of that kind which may hereafter be invented by Charles A. Rolfe, or owned and controlled by the Rolfe Electric Company.

Chicago, Ill., May 6th, 1904. **ROLFE ELECTRIC COMPANY, By Charles A. Rolfe, President**

If in need of TELEPHONES "connect up" and let us talk it over together. While we are only one of many, the "Williams" is *the one* you should investigate.

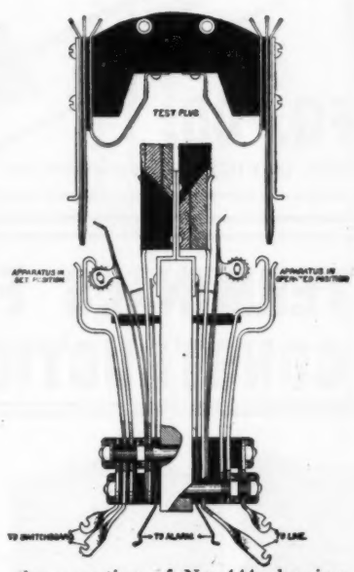
WE OPERATE A FACTORY
NOT A REPAIR SHOP

The Williams Telephone & Supply Co., 82 Seneca St., Cleveland, O.

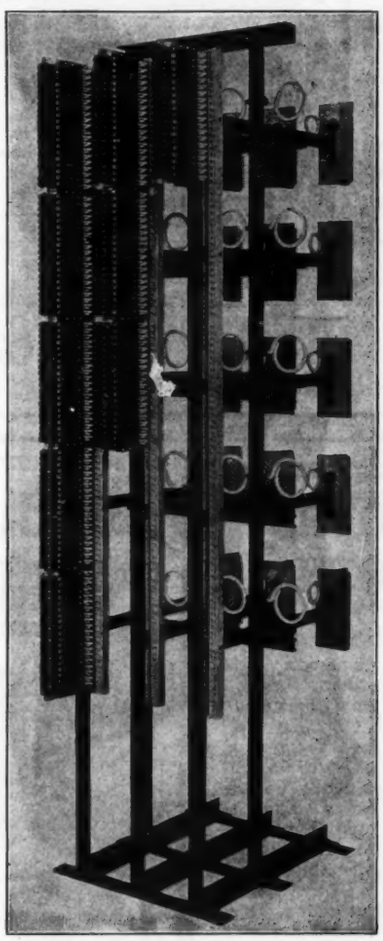
Cook's New Protector

IS A LONG STEP IN ADVANCE

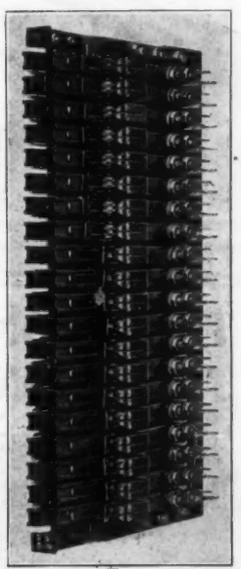
No. 444 is equipped with **SELF-SOLDERING HEAT COILS.** It is a great deal better, in a great many respects, than any other system of protection on the market. It is better in the matter of price, and it **COSTS YOU NOTHING TO MAINTAIN IT.** It is fully covered by patents.



Cross section of No. 444 showing position before and after operation of heat coils. The test plug which is also shown, permits of every possible test being made without disturbing apparatus.



Type L.—Cook Sectional Distributing Frame, with Strong and Sneak Current Protectors arranged in sections of 20 and 25 pairs. Patented May 20, 1890; July 8, 1902; Aug. 12, 1902; Aug. 12, 1902. Other patents pending. All sizes. Any capacity. Standard or self-soldering heat coils.



A bank of twenty pairs of No. 444 protectors, showing upper eight on right hand side operated. Efficiency and simplicity characterize this modern protector.

Convince yourself by writing for prices and detailed description. I'll send a sample if you want to see it.

FRANK B. COOK,

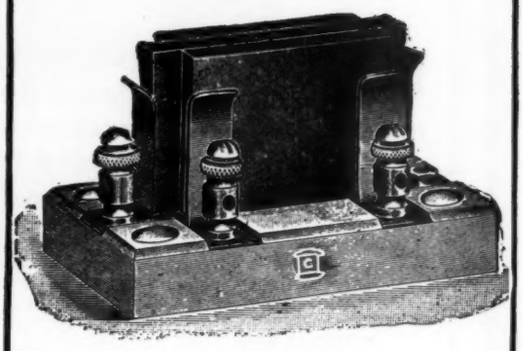
Mfr. of Telephone and Electrical Supplies. **242-246 W. Lake St., Chicago.**

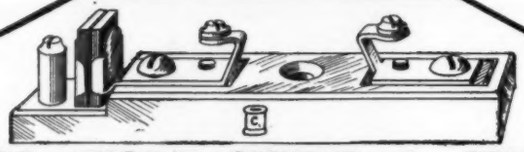
Please tell the Advertiser you saw his Announcement in TELEPHONY.

BEYOND A DOUBT

We are what we claim to be, the leading manufacturer of TESTED FUSE WIRE AND STRIP, FUSE LINKS, ENCLOSED FUSES, FUSIBLE LINKS, TUBULAR LINE FUSES, TELEPHONE FUSES AND BLOCKS, OUTLET BOXES, WIRE JOINTS. Write for Catalogue

TRADE MARK





CHICAGO FUSE WIRE & MFG. CO.

CHICAGO OFFICE: 358 Dearborn St. BUFFALO OFFICE: Mutual Life Bldg. NEW YORK OFFICE: 853 Broadway, New York

TELEPHONE BOOTHS
TELEPHONE BOOTHS

From the numerous re-orders received from Telephone Companies who have formed the habit of installing our booths, we judge the opinion prevails that that is the wise thing to do. Still there are a lot of fellows in the business who haven't ordered as yet and know not, therefore, what may be achieved in this particular, by forming one good habit.

Our booths are right and are safe to tie to.

YESBERA MFG. CO.
TOLEDO, OHIO

CABLE TERMINALS FOR CABLE CONSTRUCTION.

25 Pair Type B.

Hall Cable Boxes

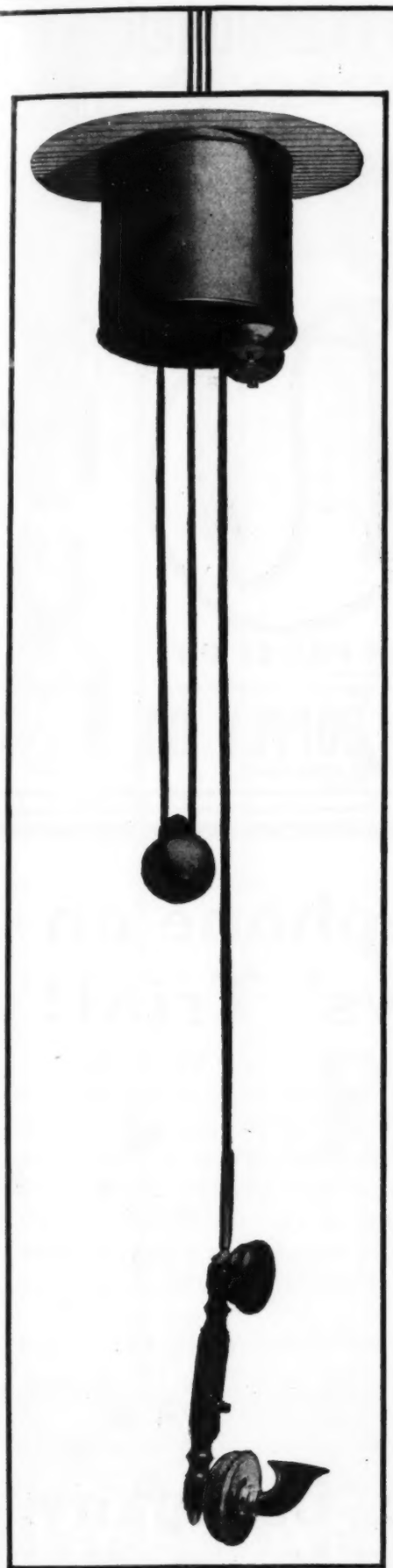
Neat, Substantial, Convenient, Designed for Underground and Aerial Installations, in all sizes; each pair provided with lightning protection.

Manufactured by

THE MOUNTAIN STATE ELECTRIC CO.

Correspondence Solicited. WHEELING, W. VA.

Please tell the Advertiser you saw his Announcement in TELEPHONY.



TO
HIM
WHO HAS
FAILED TO
IN ANY WAY
RESPOND TO
OUR REPEATED
OVERTURES; AND
TO HIM ALSO, WHO,
INQUIRING, HAS FAILED
OF CONVICTION, THIS
NOTICE IS CONSIDERATELY
INSCRIBED; FOR HE WHO HAS
PREVIOUSLY MADE PURCHASE
HAS BEEN OTHERWISE INFORMED.

N. B.—ON THE FIRST DAY OF AUGUST,
A. D. 1904, WE WILL INCREASE THE PRICE OF

The Pendent Telephone

ONE DOLLAR

OUR REASONS ARE:

1—We have adopted a thoroughly time-tried and proven **Coiled Piano Wire Cord,** thus precluding the last possibility of trouble, but considerably increasing our cost.

2—We are **exclusively** furnishing a perfect and elegant instrument which combines all the advantages of other types with its own exceptional qualities—and we ask value for value.

P. S.—Exchanges generally are making an installation charge of $3.00, or an additional monthly charge of 25 cents to 50 cents for the convenience, and are warranted in it.

A Dollar Saved is a Dollar Made—Remember the Date

THE VOUGHT-BERGER COMPANY

MAKERS OF FIRST AWARD

TELEPHONES, SWITCHBOARDS and APPLIANCES

LA CROSSE, WISCONSIN

FARR TELEPHONES

TAKE THE LEAD for Durability, Fine Finish, Clear Talking and Loud Ringing.

OUR PRICES ARE RIGHT.

TELEPHONE SUPPLIES AND TOOLS, GET OUR PRICES ON

Wire Brackets, Pins, Cross Arms, Glass Insulatros. Can save you money.
We are outside the Trades Association. Bookkeeping blanks and ledgers free with a $10.00 order.

FARR TELEPHONE AND CONSTRUCTION SUPPLY CO.

118 and 120 W. JACKSON BLVD., CHICAGO.

Yes, a Telephone on Thirty Days' Trial!

We know words can't describe the efficiency and beauty of this instrument; therefore, we are willing to let you see it, because it can then be better appreciated. The woodwork is of handsome design and finish. The generator, transmitter and receiver are mechanically perfect, and electrically correct, and our guarantee on this instrument goes on forever. It is not simply a guarantee for a week, a month or a year, but at any time after you have purchased this instrument we will replace any part that should prove defective, when operating under proper management and normal conditions.

Isn't this a pretty clever offer? We will send it on trial, free. Examine it, test it, and then if we are not correct in our statements, send it back and we will pay the charges. Our prices are right too.

Ewing-Merkle Electric Company,

St. Louis, U. S. A.

The

SYSTEM

of the

FUTURE

AMERICAN
MACHINE TELEPHONE CO. LT'D
PIQUA OHIO AND BRANTFORD CANADA

No. 36 COMPACT TELEPHONE.

Write to

Acme Electric Company

TO-DAY

For Prices on

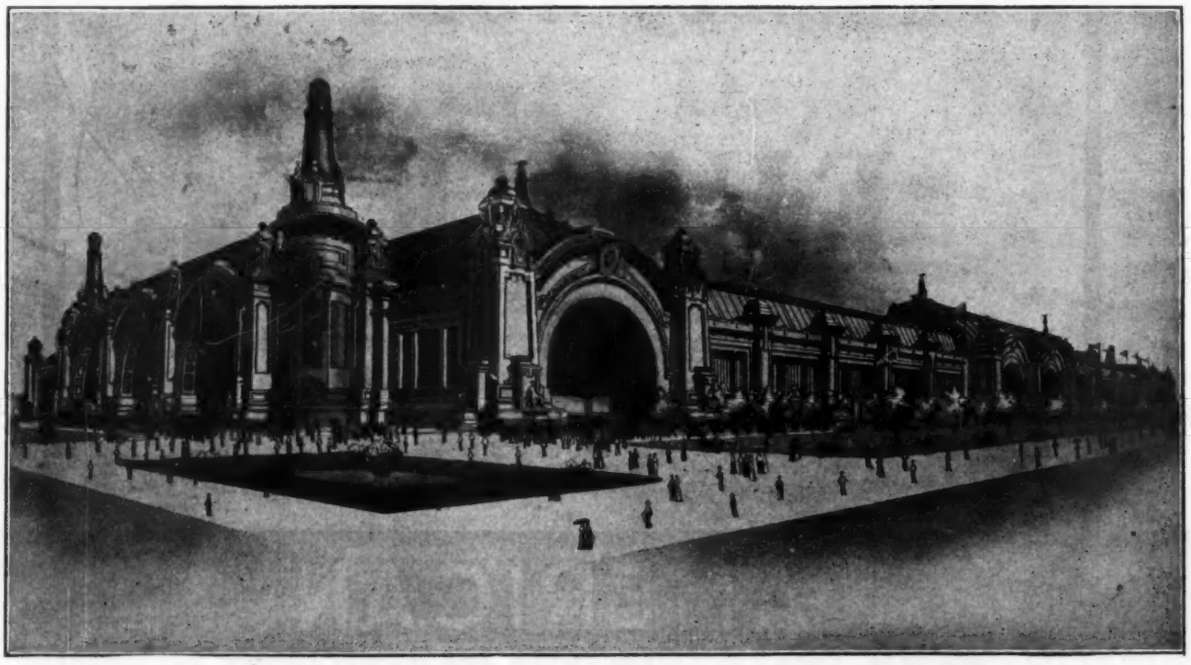
Telephone Apparatus

Best Apparatus Lowest Prices Prompt Shipments

ACME ELECTRIC COMPANY 194 S. Clinton St. CHICAGO

WORLD'S FAIR ART CATALOGUE ,,, NOW READY ,,, MAILED FREE ON REQUEST.

TELEPHONE INSTRUMENTS



TELEPHONE SUPPLIES

PALACE OF TRANSPORTATION

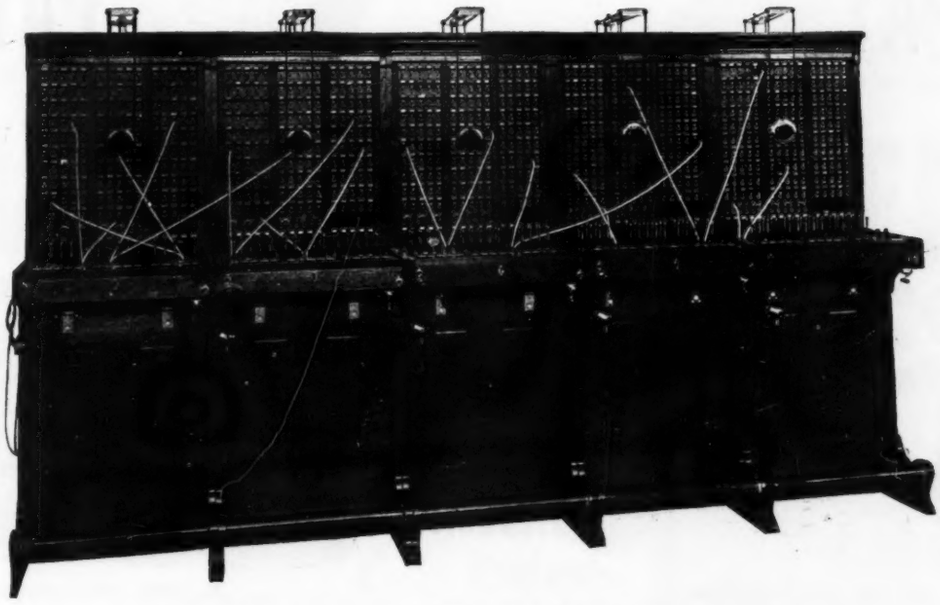
CENTRAL TELEPHONE & ELECTRIC CO. Manufacturers of High-Grade Telephone Apparatus Dealers in Everything Used with Telephones *909 Market St., St. Louis, U.S.A.*

Please tell the Advertiser you saw his Announcement in TELEPHONY.

STANDARD TELEPHONE AND ELECTRIC CO.

OFFICES AND FACTORY, MICHIGAN AND JEFFERSON STREETS

MILWAUKEE, WISCONSIN



STANDARD No. 120 SWITCHBOARD--750 LINES

WRITE FOR DESCRIPTIVE MATTER ON ALL LINES OF TELEPHONE APPARATUS

"STANDARD" TELEPHONES AND SWITCHBOARDS

ARE OF THE LATEST UP TO DATE TYPES. PERFECT IN DESIGN AND FINISH.

ALL APPARATUS GUARANTEED

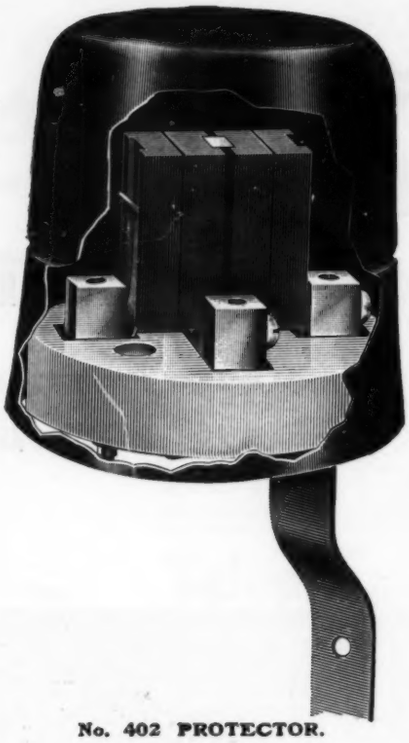
WRITE FOR PRICES **PROMPT SHIPMENTS**

Please tell the Advertiser you saw his Announcement in TELEPHONY.

We shipped a **carload** of Mica fuses in May.

We have sold so far this year over **two million** American connectors for copper and iron wire.

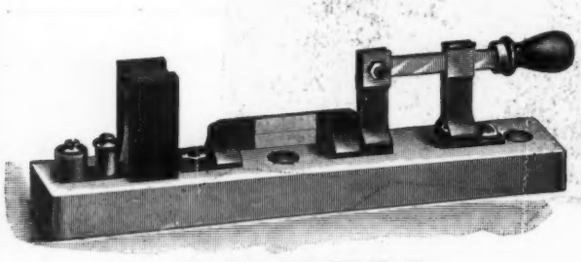
AMERICAN SPECIALTIES PAY



No. 402 PROTECTOR.

AMERICAN SPECIALTIES PAY

The No. 402 protector is designed for use outside. It has rust-proof cover, large self cleaning carbons, heavy, hollow binding posts, mounted on porcelain base. Wires connected from the bottom. A perfect outside protector.



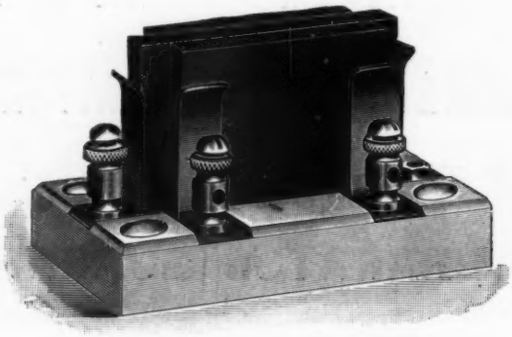
No. 501. PROTECTOR.

Our Protectors Protect.

No. 500. PROTECTOR.

No. 501 (single pole) and No. 500 (double pole) are the most satisfactory protectors for farmer or party line use. They combine a switch, fuse block and lightning arrester. Porcelain base.

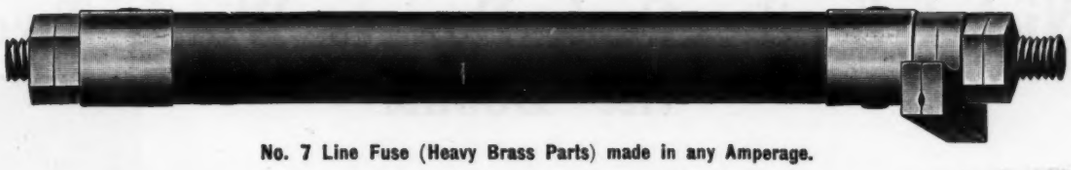
American Electric Fuse Co.



Chicago New York Atlanta

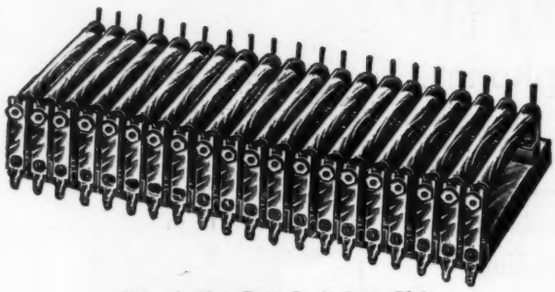
No. 400. LIGHTNING ARRESTER.

The best protector for toll line use.



No. 7 Line Fuse (Heavy Brass Parts) made in any Amperage.

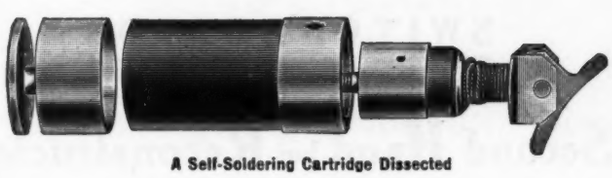
No. 10 Line Fuse. Made for No. 12 and No. 24 Protectors shown below



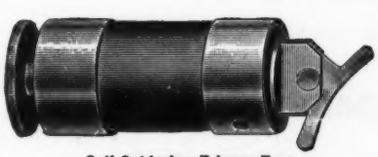
No. 12 Line Fuse Protectors, Plain

No. 24 Line Fuse Protectors with Carbon Lightning Arrester

ALL KINDS OF FUSE BLOCKS AND FUSES



A Self-Soldering Cartridge Dissected



Self-Soldering Trigger Type Cartridge Before Operating

Get a Sample

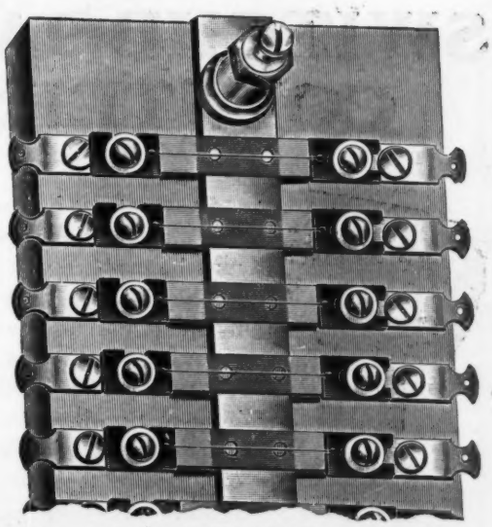
It Repairs Itself

Self-Soldering Trigger Type Cartridge After Operating

Sneak Current Protectors.

Distributing Boards

Cable Heads



No. 136. Cable Protector with Mica Fuses and Center Plate Lightning Arrester.

AMERICAN ELECTRIC FUSE CO.

CHICAGO
NEW YORK
ATLANTA

OUR PROTECTORS PROTECT

A Nickel in the Cash Box is Worth Two on the Books.

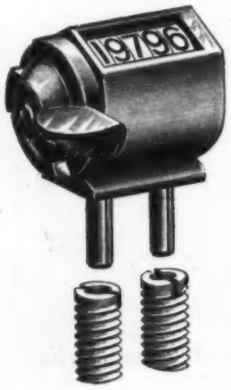
You can reduce your operating and manufacturing expense, while increasing the revenues by the liberal use of coin controlled telephones.

Write for Booklet Deadheads vs. Dividends. It's worth reading.

The Controller Company of America, 1061 Monadnock Block, Chicago.

VEEDER SWITCHBOARD COUNTERS

(STYLE 8)



Show rate of increase, so that exact calculations for the future may be made.

They likewise show how better to divide the work on the board among the operators.

Number of calls during each hour of the day can be shown. Interesting statistics are easily obtained by their use. Sockets fit in keyboard permanently. Counter can be inserted or removed at will.

Free Booklet describing 10 styles of Counters.

THE VEEDER MFG. CO.

No. 1 Sargeant St., HARTFORD, CONN.

Cyclometers, Odometers, Tachometers, Counters, and Fine Castings.

TELEPHONES and SWITCHBOARDS

Second Hand but Reconstructed

in a manner which guarantees

Original Appearance and Operating Qualities.

One Thousand Exchanges are purchasing reliable apparatus of this Company at reduced prices.

Why not You?

Write for Stock List. All Standard and Modern Makes.

Guarantee Telephone and Equipment Co.

73 & 75 W. Jackson Boulevard, CHICAGO, ILL.

THE SUCCESS OF

MONARCH TELEPHONES

Is directly attributable to their superior design and to the care with which this design has been worked out. The minutest detail of their construction has been carefully studied upon with the object in view to make a telephone instrument which will not only do the work required but do that work exceptionally well. No cheapening of apparatus at the expense of quality is found in Monarch Telephones.

MONARCH TELEPHONE MFG. CO.

12-16 South Clinton Street Chicago · Illinois

Please tell the Advertiser you saw his Announcement in TELEPHONY.

The HALLETT IRON WORKS

92-96 W. Polk St. Chicago, Ill.

We want you to know about our Guy Plate—It's a fine thing. Guying Season is here and your inquiry will be given prompt attention.

ASK FOR OVR CATALOG.

WE CARRY IN STOCK

everything necessary for the construction, maintenance and operation of any sized telephone system

We have built our present large business by careful attention to orders, prompt shipments, low prices and standard supplies Send us a trial order

ILLINOIS ELECTRIC CO.

THE MODERN ELECTRICAL SUPPLY HOUSE CHICAGO

Please tell the Advertiser you saw his Announcement in TELEPHONY.

C N 174

NOTICE the quality of NORTH telephones. They are built for wear and are known for the good character of service rendered. Repair bills on these telephones are rare and never become a serious matter.

OUR apparatus is not only easy of access, but all parts are built on the interchangeable basis, making repairs quick as well as inexpensive. Inspectors never slight their work on NORTH telephones because they are so easy to fix.

REGULAR types of telephone apparatus of all kinds are furnished by The NORTH Electric Co., as well as many kinds not made by others. We furnish COMPLETE SYSTEMS for all classes of telephone service.

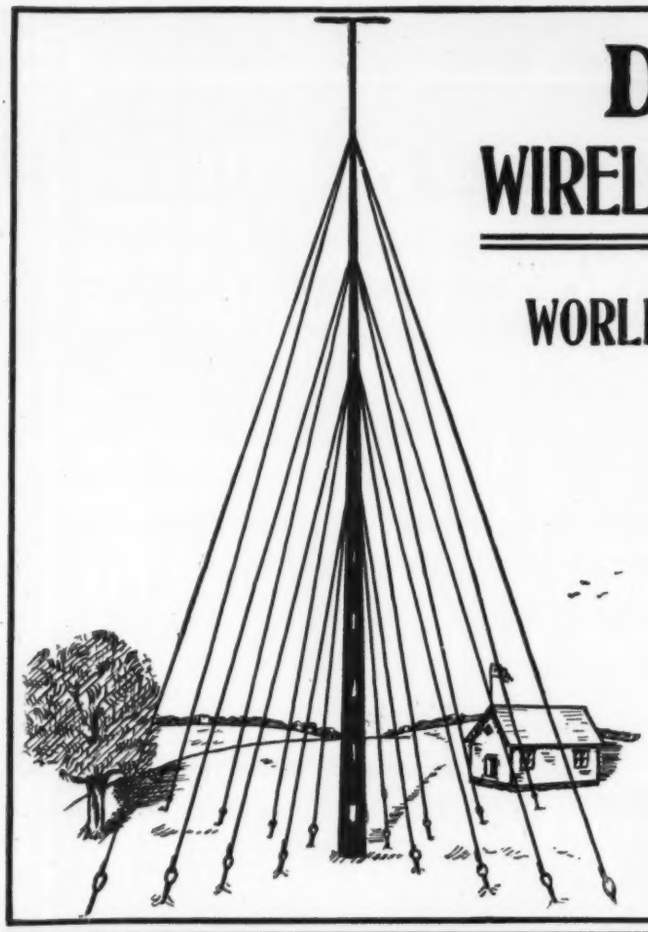
TALK does not make good equipment. We let ours speak for itself—also those who use it. They compare other makes to that of the NORTH Electric Co. when speaking of quality and excellence of service.

HONESTY in make-up is the motto of our telephone apparatus—it is likewise characteristic of our treatment of customers. This is why we can guarantee our goods—and why our guarantee is considered good.

We Have Catalogs—Sent Free on Request.

The NORTH Electric Co.

CLEVELAND, O., U. S. A.



DE FORREST
WIRELESS TELEGRAPH STATION

WORLD'S FAIR GROUNDS, ST. LOUIS, MO.

This great mast is 210 feet high, held in place by our No. 5 Guy Anchors. These anchors are 10x25 inches, fitted with rods nine feet long, one inch in diameter, and are set eight feet deep. They stand a strain of 40,000 pounds each.

"THEY NEVER PULL UP"

THE MILLER ANCHOR COMPANY

Write for prices. **NORWALK, OHIO**

"BARRARM"
CLEVELAND

DOUBLEDAY-HILL ELECTRIC CO.
MANUFACTURERS AND DEALERS

ELECTRICAL SUPPLIES
PITTSBURG, PA.

Complete Line of Telephone Construction Material.

QUICKEST DELIVERY, HIGHEST GRADE, LOWEST PRICES.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

STROMBERG-CARLSON

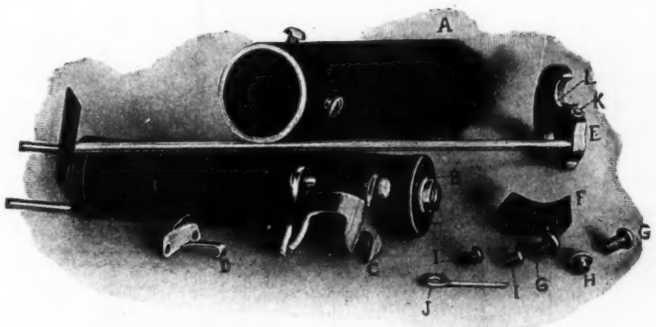
Central Energy Visual Signals

Visual Signal Complete

Same as shown, are used on switchboards ranging from 50 lines to 3600 lines capacity and

Give Perfect Satisfaction

Hard Rubber Insulation



Drawn Steel Shell

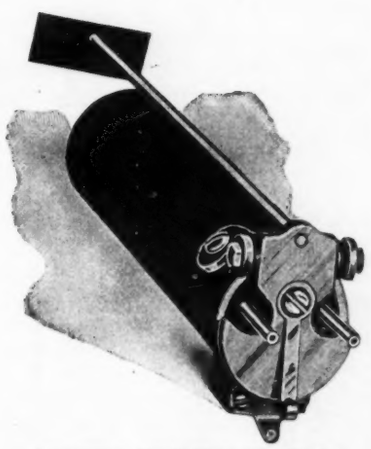
Visual Signal Parts with Night Alarm Contact

List of Users is Evidence

We can mail illustrations of switchboards of various capacities equipped with this type of signal.

Our new bulletin No. 11-C on Generator-Call Telephones contains our latest improvements in this line.

If you want to keep up with the times you will write for a copy of No. 11-C.



Armature End Showing Night Alarm Contact

Stromberg-Carlson Tel. Mfg. Co.

General and Eastern Sales Office, **Rochester, N. Y.** Sales Department, **Chicago, Ill.**

OSCAR WENTWORTH ROGERS' ESTIMATES FOR TELEPHONE PLANTS IN IOWA

FALLER AUTOMATIC OPERATOR. ALL LINES UNDERGROUND.

ITEMS	Place: Des Moines (62139) Acc't	Over 25,000, under 50,000 TOWNS Name	Popul'n	Proposed Plant Acc't	Over 10,000, under 25,000 TOWNS Name	Popul'n	Proposed Plant Acc't	Over 5,000, under 10,000 TOWNS Name	Popul'n	Proposed Plant Acc't	Over 2,000, under 5,000 TOWNS Name	Popul'n	Proposed Plant Acc't
		Dubuque	36,297		Burlington	23,201		Ft. Madison	9,278		Albia	2,989	
		Davenport	35,254		Clinton	22,698		Oskaloosa	9,212		Algona	2,911	
Business Phones	1,000	Sioux City	33,111	800	Ft. Dodge	12,162	500	Boone	8,880	250	Ames	2,422	100
Residence Phones	2,000	Council Bluffs	25,802	1,700	Keokuk	14,641	1,000	Iowa City	7,987	500	Anamosa	2,894	300
Business Rates	15	Cedar Rapids	25,656	15	Marshalltown	11,544	15	Creston	7,752	15	Belle Plaine	3,283	15
Residence Rates	10		156,120	10	Muscatine	14,073	10	Mason City	6,746	10	Bloomfield	2,105	10
Av. Length Lines	½m.			½m.	Ottumwa	18,197	½m.	Cedar Falls	5,319	½m.	Carroll	2,882	½m.
Percentage Conduits	100			100	Waterloo	12,580		Centerville	5,256		Charlton	3,989	
Connectors per 100 Subscribers						129,096	100	Oelwein	5,142		Charles City	4,227	
								Atlantic	5,046	100	Cherokee	3,865	100
									70,618		Clarinda	3,276	
											Colfax	2,053	
											Corning	2,145	
											Cresco	2,806	
											Decorah	3,246	
											Denison	2,771	
											Eagle Grove	3,557	
											Eldora	2,233	
											Emmettsburg	2,361	
											Estherville	3,227	
											Fairfield	4,689	
											Glenwood	3,040	
											Grinnell	3,860	
											Hamburg	2,079	
											Hampton	2,727	
											Harlan	2,422	
											Independence	3,656	
											Indianola	3,261	
											Iowa Falls	2,840	
											Jefferson	2,601	
											Knoxville	3,131	
											Lake City	2,708	
											La Mars	4,146	
											Manchester	2,887	
											Maquoketa	3,777	
											Marengo	2,007	
											Marion	4,102	
ESTIMATED COST											Missouri Valley	4,010	
											Monticello	2,104	
Central Equipment	60,000										Mt. Pleasant	4,109	
Subscribers' "											Nevada	2,472	
Building	5,000										Mew Hampton	2,339	
Conduits	25,000										Newton	3,682	
Armoured Cables	36,876										Osage	2,734	
Manholes	4,600										Osceola	2,525	
Engineering Exps.	10,000										Pella	2,623	
Contingencies	5,000										Perry	3,986	
Distributing, &c.	36,000										Red Oak	4,355	
											Sac City	2,079	
Total	$182,476			152,065			91,238			45,619			24,360
											Sheldon	2,282	
											Shanandoah	3,573	
											Spencer	3,095	
											Storm Lake	2,169	
											Speart	2,079	
											Tama	2,649	
											Tipton	2,513	
											Villisca	2,211	
											Vinton	3,499	
											Washington	4,255	
Capitalization per Phone	61			61			61				Waukon	2,153	61
											Waverly	3,177	
DEPRECIATION											Webster City	4,613	
											What Cheer	2,746	
Conduits, 3%	3,524										Winterset	3,089	
Other Plant, 6%	3,600											194,188	
Total	$7,124			5,940			3,562			1,781			960
EXPENSES													
Engineer and Manager	1,500												
Assistant	720												
Sec.-Tr. and Bookkeeper	900												
Storekeeper	360												
Stenographer	960												
4 Inspectors @ $60	2,880												
Heat, Light, &c	1,000												
Total	$8,320			6,950			4,160			2,750			1,500
SUMMARY													
Revenue	35,000			29,000			17,500			8,750			4,500
8% on Capital	14,598			12,165			7,299			3,650			1,948
Depreciation	7,124			5,940			3,562			1,781			960
Expenses	8,320			6,950			4,160			2,750			1,500
Surplus	4,958			3,945			2,479			569			93

OSCAR WENTWORTH ROGERS' ESTIMATE FOR TELEPHONE PLANTS IN IOWA

FALLER AUTOMATIC OPERATOR. ALL LINES UNDERGROUND.

Over 1,000, under 2,000

TOWNS		Proposed Plant
Name	Popul'n	Acc't
Ackley	1,445	
Adel	1,213	
Afton	1,178	75
Akron	1,029	125
Alton	1,009	15
Audubon	1,866	10
Avoca	1,627	½m.
Bedford	1,977	
Bellevue	1,607	
Belmond	1,234	100
Britt	1,540	
Brooklyn	1,188	
Calmar	1,003	
Cascade	1,266	
Cincinnati	1,212	
Clarion	1,475	
Clear Lake	1,706	
Columbus Jct.	1,099	
Coon Rapids	1,017	
Corydon	1,477	
De Witt	1,383	
Dunlap	1,355	
Dyersville	1,323	
Eddysville	1,230	
Eldon	1,850	
Elkader	1,321	
Farmington	1,332	
Fayette	1,315	
Fonda	1,180	
Forest City	1,758	
Garner	1,283	
Grand Jct.	1,113	
Greene	1,192	
Greenfield	1,300	
Grundy Center	1,322	
Guthrie Center	1,193	
Guttenberg	1,620	
Hartley	1,006	
Hawarden	1,810	
Hedrick	1,035	
Humboldt	1,474	
Ida Grove	1,967	
Keosauqua	1,117	
Lake Mills	1,293	
Lamont	1,540	
Lansing	1,488	
La Porte	1,419	
Lenox	1,014	
Leon	1,905	
		12,180
Logan	1,377	
Lucas	1,132	
McGregor	1,498	
Madrid	1,021	
Malvern	1,166	
Manning	1,169	
Manson	1,424	
Mapleton	1,099	
Montezuma	1,210	
Moulton	1,420	
Mt. Ayr	1,729	61
Mt. Vernon	1,629	
Mystic	1,758	
Nashua	1,263	
New London	1,003	
New Sharon	1,252	
Nora Springs	1,209	
		480
Northwood	1,271	
Odebolt	1,432	
Onawa	1,933	
Orange City	1,457	
Parkersburg	1,164	
Rhinebeck	1,203	
Rockford	1,080	
Rock Rapids	1,776	
Rock Valley	1,054	
Rockwell City	1,222	
Sabula	1,029	
Sanborn	1,249	
Seymour	1,703	
Sibley	1,289	
Sidney	1,143	
Sigourney	1,952	
Sioux Rapids	1,005	
Spirit Lake	1,219	
State Center	1,008	
Story City	1,197	
Strawberry Pt.	1,012	
Sumner	1,437	
		863
Toledo	1,941	
Traer	1,458	
Valley Jct.	1,700	
Wapello	1,398	
W. Burlington	1,044	
W. Liberty	1,690	
West Union	1,935	
Williamsburg	1,100	
Wilton	1,233	
Woodbine	1,285	
	133,124	
		2,375
		975
		480
		863
		57

Over 500, under 1,000

TOWNS		Proposed Plant
Name	Popul'n	Acc't
Adair	878	
Alden	709	
Allerton	950	30
Alta	561	70
Anita	968	15
Arlington	869	10
Armstrong	907	½m.
Ashton	513	
Aurelia	621	
Bancroft	839	100
Batavia	533	
Battle Creek	542	
Beacon	953	
Birmingham	922	
Blairstown	592	
Blanchard	520	
Blockton	704	
Bonaparte	898	
Brighton	807	
Buffalo Center	875	
Burt	504	
Bussey	550	
Comanche	718	
Cambridge	667	
Carlisle	553	
Carson	632	
Casey	568	
Center Point	674	
Central City	623	
Charter Oak	772	
Churdan	626	
Clarence	675	
Clarksville	849	
Clearfield	698	
Clermont	513	
Coin	574	
College Springs	693	
Colling	540	
Correctionville	935	
Corwith	651	
Cumberland	591	
Dallas Center	625	
Davis City	617	
Dayton	753	
Delmar	592	
Delta	691	
Dexter	795	
Doon	545	
Dows	818	
		6,090
Durant	560	
Dysart	902	
Earlham	630	
Earlville	618	
Early	579	
Edgewood	565	
Elgin	635	
Elliott	516	
Elma	976	
Emerson	502	
Epworth	549	
Essex	710	
Exira	851	
Fairbank	644	
Farley	513	
Farragut	514	
Fontanelle	853	
		240
Fredericksburg	565	
Fremont	542	
Garden Grove	651	
Gilmore City	687	
Gladbrook	842	
Glidden	783	
Goldfield	628	
Gowrie	681	
Gravity	549	
Griswold	900	
Hamilton	538	
Hawkeye	518	
Hazelton	500	
Holstein	870	
Hopkinton	767	
Hubbard	676	
Hull	626	
Hunneston	945	
Ireton	545	
Jesup	690	
Jewel	947	
Kalona	530	
		400
Kellogg	653	
Keota	996	
Kingsley	720	
Lake Park	541	
Lake View	591	
Lamont	636	
Laurens	853	
Lawler	646	
Le Claire	997	
Lehigh	806	
Lewis	613	
Limesprings	605	
Linesville	690	
Lisbon	956	1,150
Livermore	618	487
Lohrville	597	240
	42,760	400
		23

TOWNS		Proposed Plant
Name	Popul'n	Acc't
Lone Tree	600	
Lorimer	587	
Lowden	544	30
Luverne	534	70
Manilla	773	15
Marathon	659	10
Marble Rock	573	½m.
Marcus	718	
Maxwell	810	
Mechanicsville	706	100
Mediapolis	725	
Milo	585	
Milton	849	
Mitchellville	768	
Monona	674	
Monroe	917	
Montour	502	
Montrose	748	
Moravia	632	
Morning Sun	948	
Moville	507	
Murray	949	
Neola	921	
New Albin	543	
Newell	762	
New Hartford	570	
New Market	600	
North English	683	
North McGregor	616	
Norway	533	
Oakland	913	
Ocheyedan	599	
Ogden	933	
Olin	692	
Ossian	670	
Oxford Jct.	780	
Oxford	664	
Pacific Jct.	732	
Panora	958	
Paulina	617	
Peterson	521	
Pleasantville	738	
Pocahontas	625	
Pomeroy	910	
Porterville	984	
Prairie City	808	
Preston	593	
Pringham	814	
Radcliffe	645	
		6,090
Redfield	509	
Remsan	835	
Riceville	804	
Richland	534	
Riverside	698	
Riverton	687	
Rockwell	830	
Rowland	577	
Rolfe	994	
Russell	636	
Ruthven	787	
Sabula	918	
St. Ansgar	698	
Salem	578	
Scranton	683	
Sheffield	688	
Shelby	692	
		240
Shell Rock	839	
Schaller	661	
Shellsburg	511	
Sioux Center	810	
Sloan	643	
Springville	599	
Sutherland	722	
Tabor	964	
Tripoli	655	
Union	589	
Vail	578	
Victor	612	
Welker	505	
Wall Lake	659	
Walnut	878	
Waucoma	540	
Wellman	654	
Wesley	730	
West Bend	538	
West Branch	647	
West Decorah	531	
West Point	654	
		400
Whiting	572	
Whittemore	522	
Williams	5 0	
Winfield	820	
Winthrop	618	
Woodward	550	
Wyoming	794	
	64,362	
		1,150
		487
		240
		400
		23

To the Pioneer Mothers and Fathers of Fayette Co., Iowa:

In another page of this number of "Telephony" I have set forth some details of the business we are going to do in Iowa, commencing with West Union.

Here I will talk of why I am impelled to make the world look there for a demonstration of the complete harnessing of the mysterious magnet wind.

I am the inventor of a dynamotor which harnesses the magnet wind as completely as the windwheel harnesses the atmospheric wind.

What does this mean for the farmer of Fayette County? It means that the dynamotor can be attached to the farm windwheel and when the wind blows, whether fast or slowly, the current is generated. Then it may be used directly for lighting, heating, or power; or be stored in storage battery to be used when and where the farmer desires.

It means that at Auburn, Wolf's Ford, Eldorado, Burnham's Mills, Clermont, and many other places on the Turkey River; at Fayette and many places on the Volga River; there will the dynamotor be attached to the waterwheels, the current generated, then transmitted over small and cheap wires in cable, underground, and distributed to the farmers and the towns.

It means that the corn will be manufactured into the corn products, and upon the farm. That the beet and sorghum cane juice will be made into sugar in one process at a cost not to exceed that of raw sugar. That cheap light and heat and power for all purposes of man is at hand.

To harness magnetism has been the great dream of man. What are the forces that have permitted me to do and understand this thing and to own it for a while?

I know I was born at West Union.

My parents gave me a healthy and sanguine body and mind. They have worked for their children and the community all their lives. The father is dead—the mother still works. So it is with you all. The life of one pioneer is the life of all pioneers.

I grew up with your children, and remember them. All that I am is owing to the memory of my father and the life of my mother—to the friendship of you all and to the society of the place.

I have many friends—some of them the great of the earth—but I do not owe them my life.

So at West Union there shall be shown the method of redeeming mankind from the sacrifices of almost slavish work necessary to get the necessities of life.

And as I work I remember the toil of you pioneers—your unselfish sacrifices—your humble but rugged faith in God and man—your sublime courage. All these I shall remember when the world is accepting my invention. I would give all I am to get for them if my father could see the first machine at work. It cannot be. Therefore a great necessity is upon me to turn there and let these things, once accomplished, witness his life's relation to the working out of the great problem of life and death.

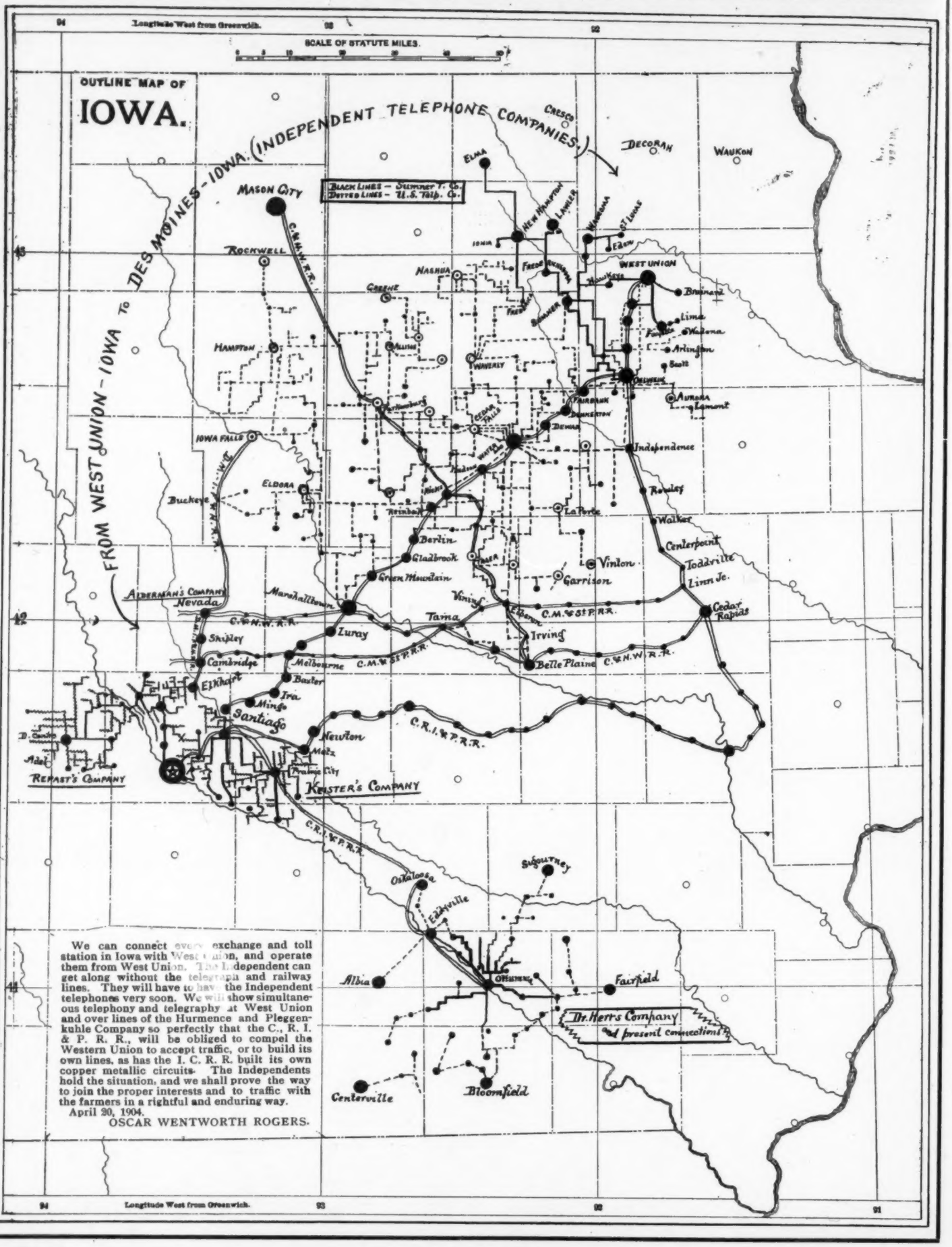
OSCAR WENTWORTH ROGERS.

St. Louis, June 20, 1904.

XUM

TO THE PEOPLE OF IOWA:

Showing how the present Independent companies can join and have long distance business through every part of the state (see text). The farmer can be served. Showing how, under Sec. 2161 of the code, the Telegraph Companies can be made to do right.



TO THE PEOPLE OF IOWA

ALL MY ARTICLES ARE FOR RECORD PURPOSES.

Since last October I have kept standing in "Telephony" the standard account (present market goods) for constructing, operating and maintaining telephone plants in every town in Iowa. There is not an item which cannot be got in the ordinary market and at price stated.

I have challenged any and all to show a material error in this account. **No one has dared to come into the open and dispute it. Every honest and capable engineer knows that it is right.**

1. **THE ACCOUNT FOR CABLES:**

(See letter of Mr. Marsh, of Standard Underground Cable Co., in October "Telephony"). Because of the manly way that the engineers of this company have acted, we choose that it shall build our first cables, and thereafter as many as it can handle. Of course others will get cables from this or other companies as may suit all concerned. Cable makers cannot object to our account.

2. **THE ACCOUNT FOR CONDUITS:**

(See letter of Mr. Barnard, of Standard, V. Clay Conduit Co., in October number of "Telephony"). We choose to give this Company our first conduit work. Of course others will order from this and other Companies. Conduit makers cannot object to our account.

3. **THE SWITCHBOARD ACCOUNT:**

(See letter of Dr. Chisholm, President of Faller Automatic Operator Co., in October "Telephony"). We choose to put this Operator in our own exchanges. We do not care where others order their switchboards or what kind they order. The Faller cannot object to our account.

Our account charges $20 per point (the price of the Faller).

The best Manual can be had for $12 per point. Certainly no manufacturer of Manual Switchboards will charge $20 per point. Manual Switchboard manufacturers cannot object to our account.

4. **THE AUTOMATIC ACCOUNT.**

The Strowger Automatic (a system in commercial operation in many places—Fall River, Dayton, Grand Rapids, Chicago), charges, we understand, $35 per point. On the face here appears the first objection to our account. The objection is superficial.

Taking the account for **West Union** (for there we shall prove not only the telephone business, but also that of lighting, heating and power). We find that if we had chosen the Strowger instead of the Faller that the account would be changed as follows: (We also compare the Manual with the Faller and the Strowger for the purpose of showing our Iowa people that they must view other things than switchboard prices before the telephone business can be brought to a standard.

WEST UNION, IOWA

System	Phones B	Phones R	Rates B	Rates R	Gro. Rev.	Cost Swb.	Per point	Total Cost Plant	Per Pho.	Dep.	Expenses	Net Rev.	% Profit
Faller	75	125	$15	$10	$2,375	$4,000	$20	$12,180	$61	$480	$863	$1,032	8
Strowger ..	75	125	18	12	2,850	7,000	35	15,180	76	731	904	1,215	8½
Manual	75	125	20	17	3,625	2,400	12	10,580	53	1,258	1,540	827	8

We have increased Strowger switchboard cost from ..... $4,000 to $7,000
depreciation account from ..... 480 to 731
operating account from ..... 863 to 904
rates from ..... 15-10 to 18-12

To lessen rates, the Strowger would have to show the depreciation and operating accounts to be less than here stated, or charge less than $35 per point for the switchboard. The accounts for depreciation and operation are rather low. Certainly we are tender with the Strowger here. As to the $35 per point we are willing to remember that the Strowger bore the brunt of the fight for the automatic against the manual for ten years and should have good profits.

Therefore, if we had selected the Strowger for West Union, we would have to increase rates from 15-10 to only 18-12 in order to still pay 8% dividend. **Keep in mind that our demand is that the dividend upon capital invested in the telephone business shall be limited to eight per cent.**

If we are to be limited to present and open market systems, then I firmly believe that 15-10 rates and 8% dividends can only be had by using the Faller Automatic Operator.

I also firmly believe that experience will show that the Strowger can be operated at rates far below those required by the perfected or best manual systems.

The Strowger people should not object to our account.

In the last few months the Automatic has been running away with the Manual. No more proof is needed than to look at the Faller Automatic and Semi-Automatic and the Strowger exhibits at St. Louis. Even the Bell is desperately plunging its wretched and useless automatic into the contest. When the Bell gets its exhibit up everyone will know that Mr. Dommerque was right when he declared that the Bell experts had proved the Bell Automatic to be useless.

All one will have to do is to look at the Bell Automatic—and then go around the corner and see the Faller and the Strowger in order to know how brazen the Bell-Kellogg Dommerques have been in discussing telephone business.

5. **THE MANUAL ACCOUNT:**

Now I wish the consumer—the farmer—the townspeople in the telephone business to look at the above table and compare the Manual for West Union with the Automatics.

We have decreased the manual switchboard cost from ..... $4,000 to $2,400
We have increased the depreciation account from ..... 480 to 1,258
We have increased the operating account from ..... 863 to 1,540
We have increased rates from ..... 15-10 to 20 17

To lessen rates the Manual people must show the depreciation and operating accounts to be less than here stated. It is these accounts that wreck the Manual systems. To show how little the price of the switchboard has to do with the business of constructing, operating and maintaining a telephone system we will assume that we had decided to use the Manual system at West Union, and the Manual people had given us the switchboard for nothing. Our capital would then be $8,180.

It would still cost $1,258 to maintain the gift and the plant.

It would still cost $1,540 to operate the gift and the plant.

Add 8% dividend, $654 and we have a total of $3,452.

This would enable us to reduce the rates only from 20-17 to 19-16. In view of these plain facts what do you think of the charming volunteer agent and protector of Manual switchboards—the **Shrieking Virtue of Sound Waves** still standing upon the street corner and indignantly refusing to publish articles never yet offered and never to be offered to her.

Instead of trying to show wherein our account may not be correct, the editor of **Sound Waves** is making a record of incompetency. He is voluntarily and with apparent delight going into that class of malcontents which, in an unbroken line, has always opposed any improvement concerning the welfare of man.

I wish for no associates who shut their eyes to the great fact that everywhere on the earth men are working, without rest, to locally apply some expression of the entire magnetic force of the universe for the benefit of mankind. I sincerely wish that the editor of **Sound Waves** may have his mind enlarged somewhat and his heart very much tempered so that he might demand a place among such men as are constantly helping even me to a clearer view of the rights of mankind.

OUR PLANS FOR WEST UNION.

So far, in this paper, I have been discussing just the present market telephone development. In former articles I have fully outlined our plans to show at West Union a complete revolution in the matter of applied magnetism for lighting, heating and power. The telephone business is just an easy beginning.

The one purpose (after a sincere desire to have the people of Iowa first know of and possess my inventions), in constantly restating the proposed revolution is to make a record; so that when these things are done an invulnerable claim for priority may be had.

I have hundreds of witnesses to the facts. I am constantly stating the facts, **but am never describing or publishing the methods of my inventions.** So every time any one denies the possibility of doing the things claimed, or denies that the stated facts exist we record that also. **The legal significance of this situation cannot be fully appreciated until one sees our demonstrations, already made. We have the record of denials of every stated fact from nearly every expert agent, manager, and creature of the combinations that have been robbing the people of even their ideas. When the facts are demonstrated at West Union then thieves cannot claim ownership of things which they have declared could never even exist.**

So we must go on very carefully at West Union. We have a machine which could be put in at West Union and the current therefrom would operate present local Independent plant and the iron wire grounded circuits of the companies from West Union to Des Moines as, shown on the annexed map. On account of late developments, requiring organizations, we must go slowly. In the meantime we are enlarging our West Union proposition. We are actually demonstrating, in New York, the whole telephone matter as well as lighting, heating, power, and electrolysis for all purposes—to such as are worthy and worth the while. Every day there comes to me the help of new converts—men with heart and brain. **And it is time to prove that men are worth more than monies—that character is greater than greed, and that the interests of the producer from the soil, the ore, the forest and the air, must first be considered and fixed.**

The labor of God gave to man the ore, the forest and the air.

The labor of man produced the windwheel.

So when the wind (God's labor) blew into the windwheel (man's labor), out of the entirety of the energy of the universe there was localized some of that energy.

SO MAN HAD HARNESSED THE WIND.

The labor of God gave to man the waterfall. Man made the waterwheel and placed it in the waterfall.

SO MAN HAD HARNESSED THE WATERFALL.

The labor of God gave to man the lodestone and iron and copper ore. Man took the ore and labored until he had an aggregation of worlds we now say is iron. He then still labored, and mixed the thing he now thinks is carbon with the iron, and steel was the result. He then shaped the steel into the thing he now says is a "magnet." He then took the copper ore and labored until he had the aggregation of worlds he now says is copper wire.

He then took his "magnet" and magnetized it by rubbing it with the lodestone. The magnet, (that mysterious thing now kept filled to saturation by the energy of the universe) now had the power to more or less affect all substances brought within its line of activity.

THIS THING WE NOW SAY IS THE "FIELD MAGNET" OF A DYNAMO.

And then, after much labor, he **alternately magnetized and demagnetized** another piece of iron by putting it in and taking it out from the active lines of the field magnet.

THIS THING WE NOW SAY IS THE "ARMATURE MAGNET" OF A DYNAMO.

And then a man (Faraday, 1831) took a **copper wire circuit** and so related it to the armature magnet (in Faraday's first experiment the armature was a copper disk) that when the armature magnet was alternately magnetized and demagnetized by the field magnet—that this copper wire circuit was alternately magnetized and demagnetized with the active lines of the armature magnet.

THIS THING WE NOW SAY IS THE GENERATING COIL OF THE DYNAMO

The extension of the terminals of the generating coil is the "line" or "circuit."

If the circuit is wholly made of wire we say it is a "metallic circuit."

If one end of the wire in the coil is run to ground near the dynamo and the other end of the wire is carried off to a distance on poles and then run to ground—we say it is a "grounded circuit."

The magnetic change in, upon and around the "circuit" we say is "electricity."

SO MAN HAD FEEBLY HARNESSED MAGNETISM.

The thing now to do was to harness the magnet wind in a dynamo as directly as man had harnessed the natural wind in a windwheel. I have studied every history of the art and I know of only two men (not having seen any of my demonstrations) who have apparently got far enough away from the present reading of the Lenz Law to see that any disturbance of any atom or of any aggregation of atoms is simply the mode of some expression of magnetism or of the entire energy of the universe.

Dr. Lamar, in 1901, said some things that induced the Editor of the London Engineer to declare, "that some one will yet construct a dynamo or its equivalent that will no more have to do with 'magnetic attraction' than has now a storage battery or galvanic pile.***"

As long ago as 1894 I declared of record that a certain thing "was the method substitute for the impossible magnetic insulator of scientific authority." **I have now a Dynamotor that demonstrates these prophecies.**

Dr. Kennealy, in Jan. 1903, (Elec. W. & Eng.) said that the "induction motor was teaching us that magnetism can be expressed locally . . . and that the office of the transmission line should be that of only carrying the exciting current of the motors." (I quote from memory.)

Long ago I declared that "my motor costs no more for operation than to account for air resistance and friction and the excitation of a well constructed field." **I have such a motor.**

Dr. Hans Clemm, of Manheim, Germany, has lately visited us. He made one test (electrolytic), that proves my dynamotor current is new for all purposes of man. This I have long known. This he now knows, and he will be the first worker in Germany.

SO MAN HAS HARNESSED THE MAGNET WIND.

In West Union the demonstration thereof will be made.

OSCAR WENTWORTH ROGERS.

St. Louis, Mo., June 20, 1904.

Highest Efficiency

WITH

Handsome Appearance

ARE CHARACTERISTICS OF ALL

KELLOGG APPARATUS

KELLOGG SWITCHBOARDS

For the
Largest Exchanges

KELLOGG SWITCHBOARDS

For the
Small Exchanges

For Common Battery

For Magneto, or
For Both

Kellogg Switchboard & Supply Co.

Green and Congress Streets, Chicago

LOS ANGELES OFFICE
Seymour Building.

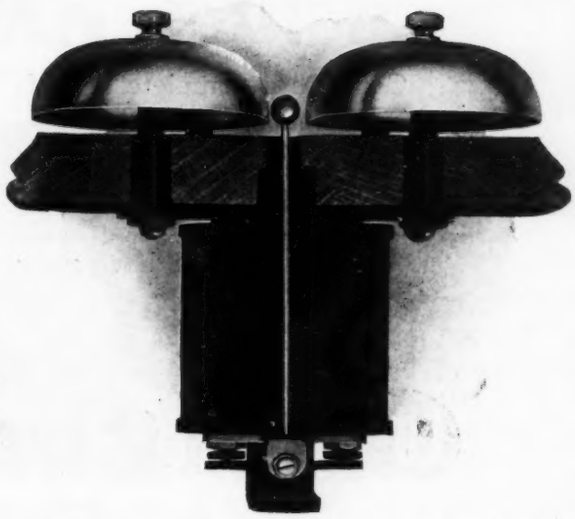
CLEVELAND OFFICE
Electric Building

PHILADELPHIA OFFICE
Keystone Telephone Bldg.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

KELLOGG TELEPHONES

Are made of the very best material.



KELLOGG TELEPHONES

Are made by the finest mechanics that can be had.

KELLOGG TELEPHONES

Are made under direct supervision of expert mechanical and electrical engineers.

Substantial in Construction and Made of the Best Material. There is No Cost to Figure for Maintenance.

Good Equipment Means Good Service and Growing Patronage.

Let Us Make You Quotations.

Kellogg Switchboard & Supply Co.

Green and Congress Streets, Chicago

LOS ANGELES OFFICE
Seymour Building

CLEVELAND OFFICE
Electric Building

PHILADELPHIA OFFICE
Keystone Telephone Bldg.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

OUR TELEPHONE CATALOGUE

Contains a complete list of "Williams-Abbott" and "Centra" Telephones and Telephone appliances, together with construction material, tools and batteries. It quotes some very attractive prices and should be in the hands of every Telephone buyer.

If you have not a copy, write us for one.

Central Electric Company,

264-266-268-270 FIFTH AVENUE CHICAGO

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and plenty of it can be made
from your toll service by placing

BAIRD PAY-STATIONS

liberally over your territory.
Look around for the Soft Spots

THEY ARE

GOLD MINES

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BAIRD MANUFACTURING CO.
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... TIME STAMPS TIME TOLL SERVICE ...

... TIME STAMPS TIME TOLL SERVICE ...

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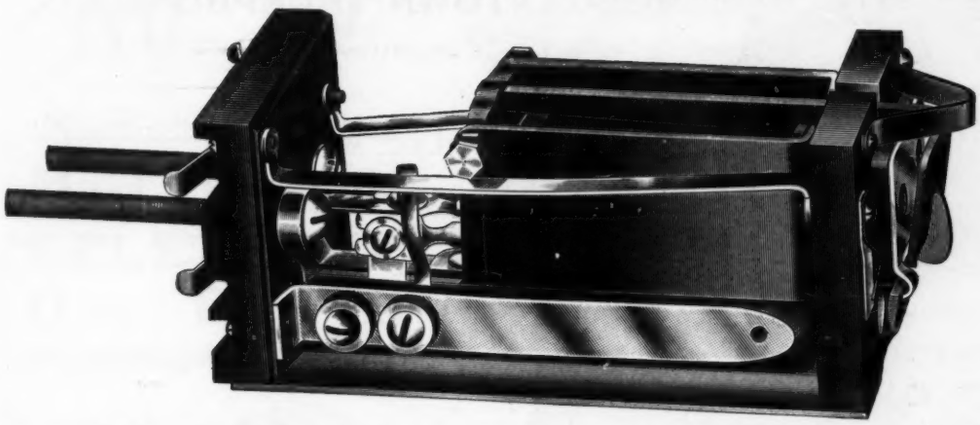
IMPROVED AMERICAN EXPRESS SWITCHBOARDS

BETTER THAN EVER



Manufactured under Patent Nos.

617,691
617,692
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620,491
624,075
625,797
669,094
674,402
692,895
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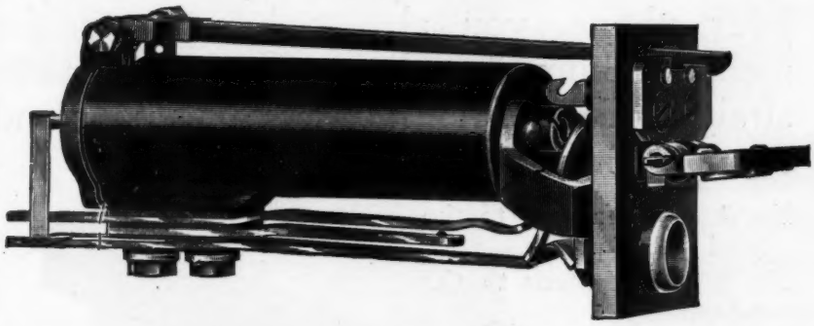
SELF-CONTAINED DROPS AND JACKS
RAPID RINGING DEVICE

All drops restored to normal position by withdrawal of plugs

SEE ALSO OUR
BELL-EXPRESS SWITCHBOARDS

Which are built with self-restoring drops and jacks in banks of 5 and 10



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AMERICAN ELECTRIC TELEPHONE COMPANY

36-58 W. Jackson Blvd., CHICAGO

OUR NEW KOKOMO No. 4.
This Transmitter does not Take Up
SIDE TONES.

Special prices on our New Transmitter.
WRITE AT ONCE.

MORGANTOWN TELEPHONE CO.
Morgantown, Ind.

April 11, 1904.

KOKOMO TEL. & ELEC. MFG. CO.,
KOKOMO, IND.

GENTLEMEN:—Please ship to us at once, 6 No. 24 Series Telephones. Same to be fitted with your new transmitters, Kokomo No. 4.

Your No. 4 transmitters are fine.

Yours truly,
EDGAR NEWMAN, Mgr.

KOKOMO TELEPHONE & ELECTRIC MANUFACTURING CO.
Kokomo, - - Indiana.

"READY" MEMORANDUM PAD HOLDERS
PATENTED

The "Ready" Pad Holder is neat, ornamental and useful. When placed beside your phone, you always have paper for memorandums or orders. Each holder has straight edge, which holds writing pads and tears off memorandums.

No. 1 Style fastens to the wall beside phone.
No. 2 Style fastens to the telephone.

Either Style $1.00 each.
By mail, prepaid, $1.25 each.
Agents Wanted.

WE MANUFACTURE
READY PAY OUT REELS and READY SPECIALTIES.

No. 1

WE CARRY COMPLETE LINE OF TELEPHONE SUPPLIES

THE W. G. NAGEL ELECTRIC COMPANY, 520 ADAMS ST. TOLEDO, OHIO

Please tell the Advertiser you saw his Announcement in TELEPHONY.

EUREKA
No. 99

Most Powerful TELEPHONE On Earth

Write us Regarding our July and August offer.

Highest Grade Switch Boards and Telephones at POPULAR PRICES

EUREKA ELECTRIC CO.

Main Office and Factory, Genoa, Ill.

Sales Dept. Monadnock Bld., Chicago, U.S.A.

"Security" Sleeves, Pot Heads and Branches

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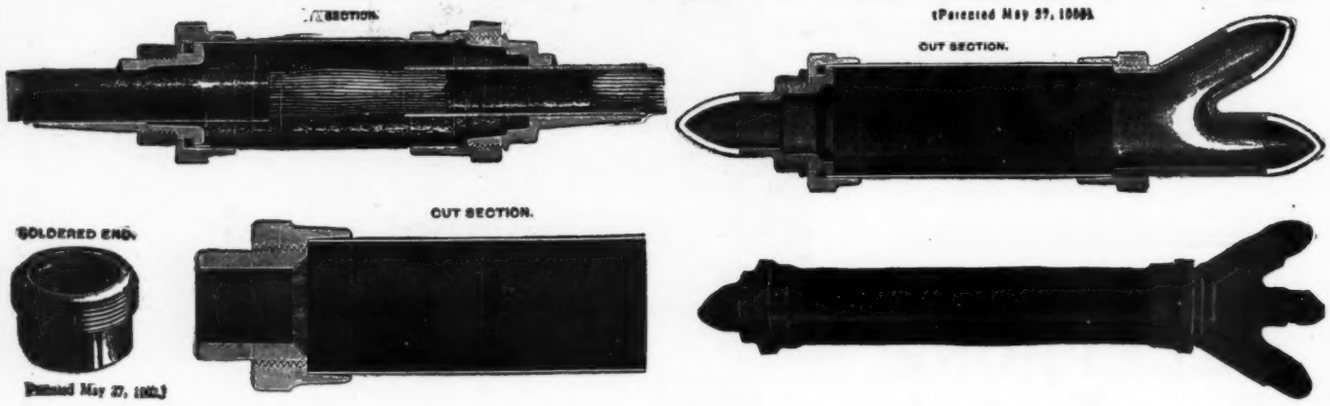

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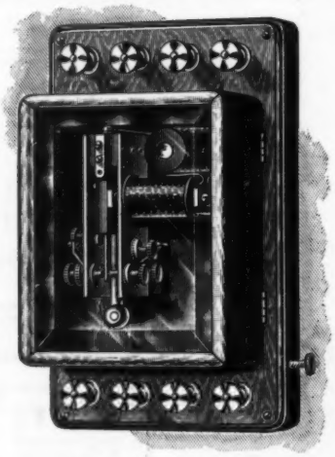

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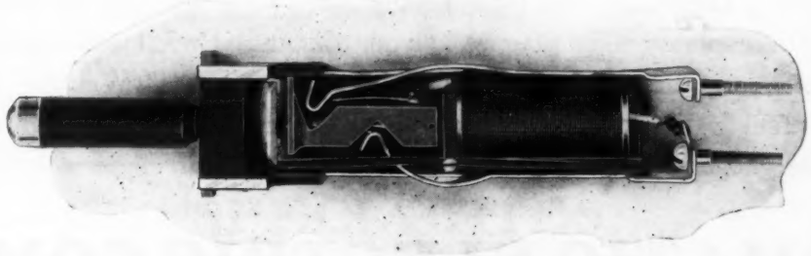

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Grand Rapids, Mich.	6,000	19,000	Augusta, Ga.	900	10,000
Dayton, O.	6,000	19,000	New Bedford, Mass.	800	10,000
*Los Angeles, Cal.	4,000	100,000	*Hopkinsville, Ky.	800	10,000
Lincoln, Neb.	3,000	10,000	Columbus, Ga.	700	10,000
Portland, Me.	2,500	10,000	Cleburne, Tex.	540	10,000
*Sioux City, Ia.	2,000	10,000	St. Marys, O.	500	10,000
*San Diego, Cal.	1,500	10,000	Albuquerque, N. M.	400	1,000
*Lewiston, Me.	1,500	10,000	Manchester, Ia.	300	1,000
Fall River, Mass.	1,250	10,000	Westerly, R. I.	200	1,000
Auburn, N. Y.	1,200	10,000	Medford, Wis.	200	1,000
*Auburn, Me.	1,200	10,000	Princeton, N. J.	150	1,000
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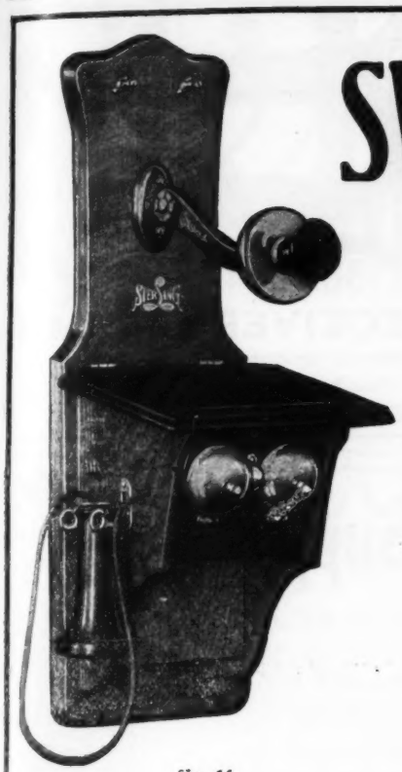

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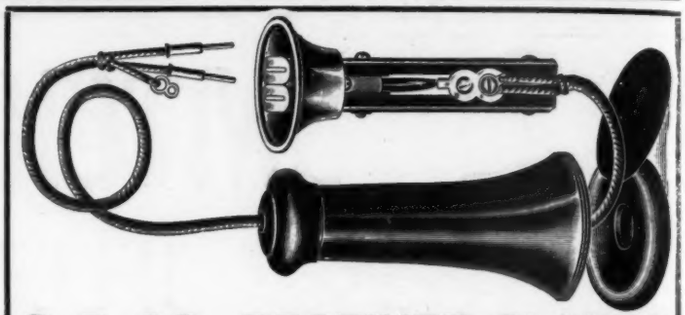

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AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

VOL. VIII. CHICAGO, JULY, 1904. No. 1.

BUCKEYE INDEPENDENTS

E. E. Knox.

Ralph Reamer.

Frank L. Beam.

For the purpose of mutual and financial protection, the Independent telephone associations of Ohio were joined at a general meeting held at the Hartman hotel, Columbus, June 2, at which time a new organization was perfected, to be known as the Ohio Independent Telephone Association and to take the place of the Independent Telephone Traffic Company, and the former organization of the Independent interests in that state. There were over 200 delegates present, representing more than 150 Independent companies.

The convention was presided over by W. G. Thompson of Lebanon, president of the association, and E. E. Knox of Portsmouth, secretary, was in his place. The meeting convened at 9:30 a. m., and was opened by an address by President Thompson, who spoke as follows:

Gentlemen of the Convention: This convention was called at this time by the committee appointed by the Cincinnati convention, held the last of February. It is needless for me to talk to the managers and persons who are interested in the Independent telephone field of the state of Ohio, as to the needs of the hour in this state of a permanent, strong, energetic Independent telephone organization. Years ago when the Bell Telephone Company had entire control of the telephone interests of Ohio, people all over the state objected to the prices they were paying for telepnone service. The objection was so strong that the telephone business in the state of Ohio lagged, and the condition in our state prevailed in other states of the union. The Bell people controlled and had a monopoly of the business.

A number of gentlemen in Ohio, when the patents on various telephonic appliances expired, organized an Independent Telephone Association. That association of men was for the promotion of Independent telephone interests. The organization grew and prospered, and from that organization afterward was evolved the national organization. Those organizations were grand and good in their day, and did a great deal of work for the Independent telephone interests of Ohio. They advertised among the people and secured capital, and they began a system of exchanges throughout the state that grew and grew until finally their work was merged into a national organization, and that organization was so complete that they were enabled to take up questions of legislation, questions of litigation, and fight them into the highest courts of this land, doing a noble work for the Independent cause in Ohio.

Finally the organization's work was completed, and afterward an effort was made to organize along other lines. Less than two years ago a traffic association was organized and some eighty or ninety managers in the state took stock in it, in order that they might secure four Independent telephone companies in Ohio, and class the equipment, standard directory covers and a standard keeping of accounts; and that organization performed its work so well that now throughout the state nearly every company has one kind of shield, one kind of a sign; many of them use the same standard method of bookkeeping, many of them use the same standard toll dockets, etc. So that when the organization had performed its work a committee was appointed at the meeting in Cincinnati, the matter was left to it, and a determination was reached by the members of that committee that they would call a convention here on the second of June, to-day, of the Independent telephone people of the state, and try, if possible, to merge these organizations into one, making it stronger and better for the fight that is now before the Independent interests of Ohio. While our opponents are strong, they have at last awakened to the idea that the people are with the Independent interests; they have at last awakened to the idea that they must go to the people for their support, and they are now making inroads along lines that mean that they have able men trying to solve the problem of saving their wrecked and ruined business throughout the state. It behooves us then as an Independent organization to form a stronger organization, that organization to take charge of the interests of our plans throughout the state, and for that reason this convention was called to-day.

Questions were discussed at the meeting in Cincinnati, committees were appointed on resolution, on postal matters and committees for a permanent organization, to be adopted here at this convention. Those committees will report. They have prepared an order of business for this meeting. and the order should be followed.

First will be an address of welcome by Mr. Lamman of Columbus, and a response by Mr. Thorpe of Wilmington. There will be remarks on the aims of the association by Mr. Hoge of Cleveland, and five-minute discussions following those remarks. There will be a question box, and we hope that all members here, and all delegates present will place in that question box anything that they want to talk about, and those remarks will be limited strictly to three minutes. There will be a report immediately after dinner—there will be an adjournment of one hour—of the committee on resolutions by Mr. Beam of Columbus, the chairman; a report of the postal committee by the chairman, and a report of the committee on permanent organization, which will submit a plan for our future government, that will be for the discussion of the convention; and afterward there will be the election of the permanent officers, who

will succeed the temporary officers of this organization for the next year.

Now, gentlemen, the matter is before you. The temporary organization has performed its work. I hope that the delegates present will realize the importance of this occasion; will enter into the work with a spirit of fraternity and with a spirit of friendliness, and that the work of this convention will be of great good to the Independent telephone interests of the state of Ohio. I thank you, gentlemen.

Following President Thompson's introductory remarks, an address of welcome was delivered by Henry A. Lamman, president of the Columbus Citizens' Telephone Company, as follows:

Gentlemen of the Convention: It strikes a responsive chord in my heart to welcome the gentlemen who have convened here in the interests of the Independent telephone movement. The nucleus of this organization was a meeting behind closed doors between Judge Thomas and Mr. Critchfield many years ago. At that time any movement in the open, antagonistic to the Bell movement, was sure to bring down some person's displeasure against the gentlemen participating in it. But the movement has grown since then.

I welcome you to the city of Columbus most heartily. If I were to do it in the conventional way, according to the rules of our mayor and the president of our board of trade, I should say to you that Columbus was the capital of the great state of Ohio; that the state of Ohio furnished our presidents and our great men; and, consequently, Columbus must be magnified as the center of the legislative body of this state. But I had an object lesson about two years ago which put a damper on self-laudation. I was one of the guests of Governor Nash at that time on his trip to San Francisco to christen the battleship "Ohio." While there the hospitable citizens of California, and San Francisco in particular, of whom quite a number are Ohioans, invited us to go out to the Cliff House in some of their elegant equipages. We arrived there and seated at the table were some of the most prominent gentlemen of San Francisco, who offered toasts. We all drank the toasts, and, of course, as visiting guests we were expected to say some nice things about San Francisco and California, also its beautiful fruit. The roses were then in their full bloom, and it certainly took no special inspiration to bring out those sentiments, but the topic of almost every speaker was the beauties of California, the fine climate, the beautiful flowers, etc. Finally we came to the Governor of Oregon, the neighboring state. He said that the occasion reminded him of an incident in a mining camp where one of the boys had gone to his last rest. His comrades desired to pay such respects as were fitting upon that occasion, Unfortunately, they had no preacher in town or in the camp, and so they sent away and got one; and they were gathered together to do honor to the departed dead. The preacher, not knowing very much about the life of the dead comrade, said what he could. He then called upon any that were present who had known the man to say a few words, and one or two responded, and then the thing began to go a little slow; there was quite a lull in the proceedings. A man sitting in the back part of the audience finally got up, moved forward and said that if no one else had anything to say he would like to make a few remarks about the salubrious climate of California. So I will refrain, gentlemen, from wearying you with the geographical position of Columbus.

We none the less most heartily welcome you, and I do say, not only on behalf of our Independent organization here, of which I am at the head, but on behalf of every citizen of Columbus, that we would welcome every day in the year such a representative body of men as I now see before me. Gentlemen I thank you.

G. P. Thorpe, attorney for the Wilmington Home Telephone Company, replied to Mr. Lamman's address of welcome as follows:

Mr. Chairman and Gentlemen, and Mr. Lamman: By the request of, and on behalf of the executive committee, and also speaking for this convention, I desire to thank you for your kind words of welcome. The Independent telephone man has been so in the habit of making himself at home wherever he goes, and quite frequently in the face of opposition, that it comes to us in the nature of a pleasant surprise, a very agreeable surprise, to receive a cordial welcome. Every place we have gone, since we were born, as a telephone company, we have had to make ourselves at home. Nobody made a home for us; all interests have been against us. We had to fight against all sorts and all kinds of opposition to force ourselves into homes of the people of the state of Ohio. We are glad to be welcomed to the center of the great state of Ohio, both on behalf of the Citizens' Telephone company of Columbus and of the people of Columbus. I recognize Columbus as the center almost of Independent telephone interests. We recognize Columbus not only as a new and rapidly growing metropolitan city, but we recognize it as the city that has given more faith, more hope and more encouragement to the Independent telephone movement than perhaps any other city in the state of Ohio, unless it be Cleveland. We cannot refrain from comparing Columbus with Cincinnati. I see by to-day's paper that the people of Cincinnati, through its representative, the city attorney, Mr. Hunt, is still fighting against the Independent telephone interests, and instead of giving us a hearty and cordial welcome they are fighting the Independent cause, not knowing what the loss will be to them. The people of Columbus have found out, I think to their gratification, that the Independent Telephone Company, and the interests of the various Independent telephone companies throughout the state, have perhaps done as much, if not more, toward advancing the material and financial interests of the city than any other one element of people, and Cincinnati will find it out perhaps ten or fifteen years from now. They are about that much behind the city of Columbus.

It is, so far as we are concerned, another matter of gratification to know that the city and the Independent Telephone Company of this city welcome us; that we are here because we are wanted here, and we sincerely hope that the business that may be transacted by this convention will do great good, not only to the city of Columbus, but to all the Independent telephone interests of the state of Ohio. Gentlemen, I thank you for your attention.

James B. Hoge of Cleveland next addressed the convention, outlining a plan of organization and setting forth the aims of the association in the following words:

Mr. Chairman and Gentlemen of the Convention: When Mr. Lamman of Columbus was talking this morning, I was reminded of the story a gentleman got off on our mayor over in Cleveland the other night. Some of the college boys were having a banquet over there, and the toastmaster introduced the Hon. Tom L. something on this order: "Some years ago a cowboy died out west, and he was a very great favorite among all the boys of the plains, and they wished to do something for him, and so they finally went out and took up a collection to get a suitable gravestone, and after they got the shaft bought and ready to put an inscription on it, they were somewhat puzzled as to what they should put on it. They studied over the matter some time and finally put on his name, but as to the motto they were not sure. At last they put below his name this inscription: 'He done his d—t; angels could do no more.'"

Now, that is what your committee has done that you have selected. We have had this matter of a convention in our minds for about three or four weeks, and we decided that the best thing to do was to get you down here at Columbus before you got to harvesting, and other things you are likely to do during the summer.

It seems to us, gentlemen, that Ohio never was in greater need of a good, thorough working organization more than it is to-day. We have at least 140,000 telephones working under the Independent telephone system to-day in the state. Just a few days ago I had a clipping brought into my office stating that down in New England four states, with a population of something over 4,000,000, had 130,000 telephones working, and it was the greatest development of any place in the world, except one or two districts in foreign countries. I made a hurried calculation and found that they had one to every thirty-one people. I then made a calculation in Ohio, and found that we had one to every twenty-nine people; that is, Independent telephones—not counting Bell telephones. In Indiana I found they have one Independent telephone to every twenty-three people. So you see we have not been very slow out here. When we come to review the telephone situation, it is simply marvelous. When the Centennial was held in 1876, in Philadelphia, the telephone had just been invented, and very few who attended that exposition knew anything about the telephone, and none of them dreamed of such progress as would be made.

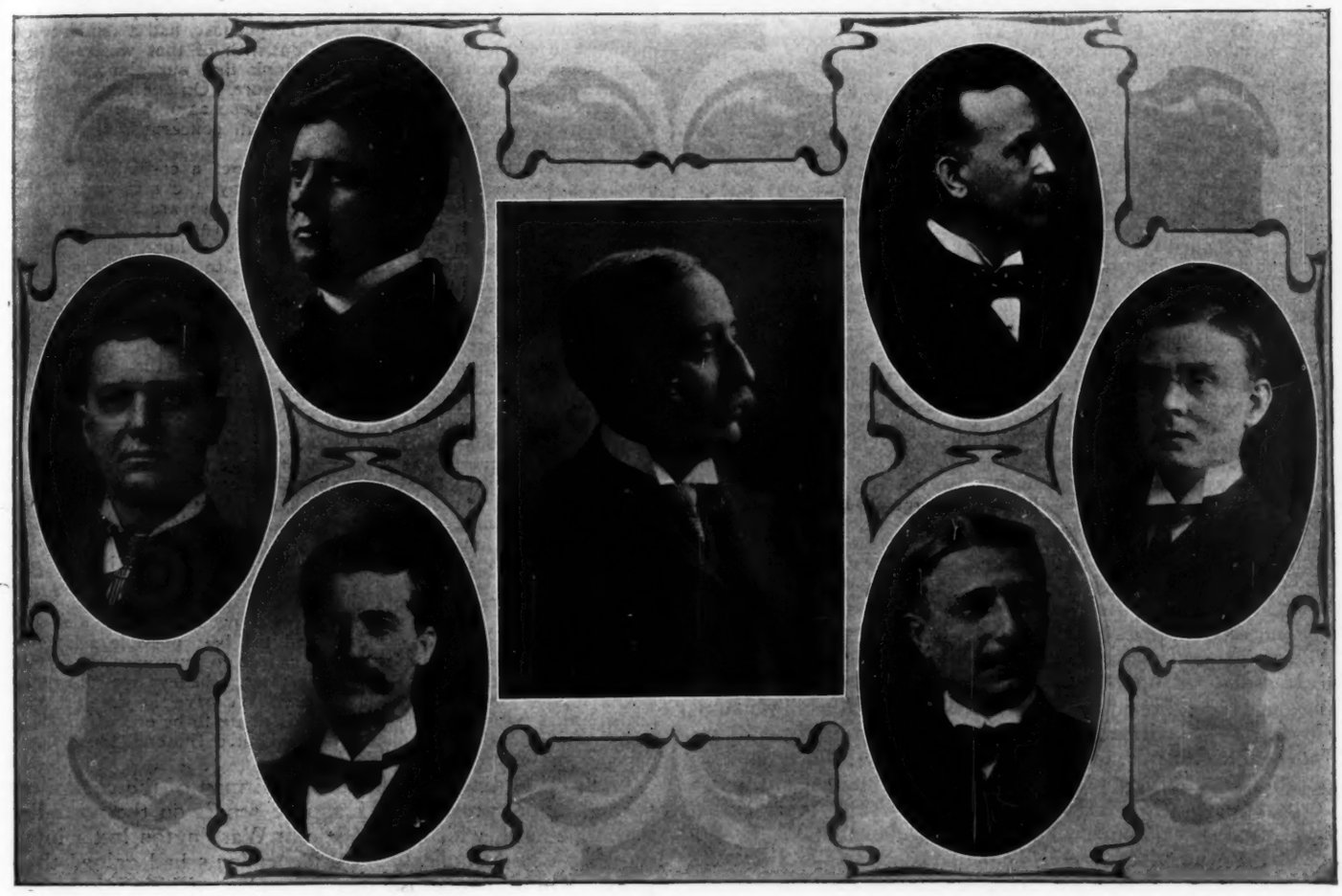
When the World's Fair was held in Chicago in 1893, the Bell people had then been in the telephone business some seventeen years, and the long distance business had just commenced to be developed. They had completed a line between St. Louis and Chicago, Chicago to Pittsburg, and of course there were lines working between New York and Boston, and some of the more important eastern cities. But generally speaking the long distance telephone was just in its infancy, and nobody had ever heard of an Independent plant at that time. A man would no more have thought of installing an Independent telephone in those days than he would have thought of going down here and getting into the penitentiary.

In 1895 the situation had changed somewhat, and to-day, at the Louisiana Purchase Exposition over at St. Louis, we find an immense exhibit there of Independent telephone manufacturers, showing all kinds of special equipments that the Independent people have developed during the past nine years, representing over 1,800,000 Independent working telephones, and an investment of over $200,000,000. There is no exhibit at the World's Fair this year that comes anywhere near touching the exhibit of the Independent telephone manufacturers representing this country.

Look at the large number of people that are actually interested in the exhibit. There must be nearly 5,000 people interested directly in the Independent telephone service. All we need to do is to get these people aroused as to what they are interested in. I saw a statement a few days ago that the Bell people had something like 15,000 stockholders. Those people are located almost exclusively in New England. But our large number of investors are scattered all over

the United States. They are the people who are actually doing things. They are composed of the politicians representing the two great political parties, the bankers, the business men, the home-makers, and all classes of people; and what we need, more than anything else, is to get an organization so that we have all of these people working in the rank and file of the organization, because your property depends so much upon what your neighbor's property consists of, and your neighbor's property depends upon what your property consists of, because you give service back and forth between those two companies. You invite and give service over your exchange and some other exchange, but your subscriber does not know the other gentleman interested. The other lines you talk over you only know as your lines. If you don't give good service your customer blames you for it. In that respect we are all interested in the same organization.

Now the plan of handling this organization has been one where every person could talk and take part. One gentleman said this morning that we had not been able to get any information from the circulars sent out. Now that is just what we propose to do. We have no set speeches. The convention is in your hands. They have decided to have the question box, and every delegate present is asked to put in some question that is important to him, and we will have it discussed, and we ask each and every one to be absolutely frank and free in discussing those subjects. I think that is the best way—to say what we mean, talk right out in open session; and if we do that we will have a much clearer understanding. We will go home feeling that we have done some good.



W. G. Thompson. Dwight E. Sapp. J. B. Rhodes. Robert E. Hamblin. J. C. Reber. J. B. Hoge. George Metheany.

VICE-PRESIDENTS OF THE OHIO INDEPENDENT TELEPHONE ASSOCIATION.

Harry B. Gates, secretary of the Queen City Telephone Company of Cincinnati, was called upon by President Thompson for a statement as to the condition of affairs at Cincinnati, and responded as follows:

Mr. Chairman and Gentlemen: I did not come up here with any idea of making a speech, because that is not particularly in my line of business. I can, however, say a few things in connection with Cincinnati that may interest everybody here.

A little over a year ago a party of gentlemen from Indiana became interested in promoting and organizing a telephone company in Cincinnati. After considerable labor, both in Cincinnati and other towns, they raised what they thought was sufficient money to build a plant in Cincinnati. They made an application before the city council, were held up for a matter of a couple or three months, and finally turned down. We then made application to the Probate court of Hamilton county, and after a fight there of about three weeks, the city being represented by its solicitor, assisted by all the attorneys that are employed in the Bell interests, the court took the case under advisement, and last Friday gave a satisfactory decision in favor of the Queen City Telephone Company. The decision was all that the promoters of the company could ask for. It gave an underground district, comprising about a mile and three-eighths in each direction, with permission to construct toll lines, or underground, in any other part of the city that we chose to select. That franchise will be accepted next Thursday afternoon.

We immediately began work upon the construction of the plant last Saturday, the day after the decision was rendered, and no matter what the delays are, the plant will be built by the Queen City Telephone Company. (Applause.)

We have not had the decision long enough to know just what our rights are, but as near as I can figure it out there are no questions that will arise that can delay the construction of the plant; and unless we find something we don't know about now, the work will progress just as rapidly as it can. The construction of the underground system will begin within the next thirty days. We have men in the field now making plats of all the underground districts and the districts over the ground, and we expect to have a complete working plan within thirty days. I do not know as I can say anything further to interest you now. But I do want to assure you all that there is no question about the construction of the Queen City telephone plant in Cincinnati.

A Member: Mr. Gates, I thought perhaps it would be further interesting to have you say something about the attitude of the people of Cincinnati towards the movement.

Mr. Gates: Of course, Cincinnati is backed in this. It is the only Bell telephone plant that I have any knowledge of that is owned locally. The controlling interest of the company in the city of Cincinnati is owned by the Kilgore people. They are very strong and powerful. They have owned up until recently the street railway interests, and being a large and strong crowd, of course, they have a large following. But notwithstanding that fact we have gotten

over 3,000 telephone contracts, and that, too, in less than sixty days' work. We don't find it any trouble to get telephone contracts. Our rates are $72 for business and $36 for residence, unlimited service, with the limited service rate at less money. We give the business house a $48 rate up to 1,200 calls, or 4 cents a call, and 3 cents on the excess up to $72. We have not made any limited service rate for a residence, because our residence rate, if anything, is too low. Our franchise, as given by the Probate court, however, does not restrict our rates. In fact, it does not make any restrictions except that we shall keep the streets in repair where we excavate them, and that we repair the streets where we excavate them for three years. I hardly think that the rate of $36 in a town the size of Cincinnati is high enough. The great trouble with the Independent telephone companies has been that their rates are too low, and especially in the large exchanges. We think in Cincinnati that we will have 30,000 or 40,000 telephones in three or four years, and at the rate of $36 it will be too low, that is, for an individual line, and we have never been connected with any exchange that has had party lines. I do not believe in them. But at a rate of $36 we have got to have party lines in a town the size of Cincinnati. The construction is expensive and the distances are great.

A Member: What would you consider a good residence rate?

Mr. Gates: We ought to have $38.

A Member: What are the Bell people getting?

Mr. Gates: They are getting $60 for an individual circuit

G. P. Thorpe: You think they give individual service?

Mr. Gates: Oh, yes. They have any prices you want. I know on cross-examination that our attorneys tried very hard to get out of the Bell people, who appeared at the Probate court, just what they were charging. I personally know Mr. Kilgore, who was on the stand two or three hours. On the first day he was on the stand he claimed that his company charged in Cincinnati for both business and residence telephones something like $48. He said before the council committee that it was $52. On cross-examination the next day, he claimed it was $41.32, or something like that. I do not believe they know themselves. But we feel that our rate of $72 for business is sufficient, and we hope that the $36 rate is all right for residences.

Mr. Hoge: How many suburban towns have you got that have not franchises yet?

Mr. Gates: We will make application in about fourteen towns and villages next Monday for franchises, and in addition to that, we will make application in Kentucky towns, in Campbell and Kenton counties, for franchises. We have never made application in any of these towns for the reason that until the franchise was granted in Cincinnati it was hardly any use to fool with the smaller towns. But the people want an Independent telephone company there. They have encouraged us already, and conditions are such in Cincinnati that you can make things move as fast as you would like. We feel that we have made pretty good headway.

The next two hours were very profitably spent in discussing various subjects that had been put in the question box. The principal discussion, in which many of the members took part, was upon two questions propounded by Washington Hyde, president of the Warren-Niles Telephone Company: "Is it practical or desirable to organize all the Independent telephone companies of this state into one corporation? Can any practical results be obtained without a corporation?" Mr. Hyde, W. M. Heseltine, representing the Citizens' Telephone Company of Delaware; W. P. Bogardus of the Mt. Vernon Telephone Company; James B. Hoge, Federal Telephone Company, Cleveland, and others gave their views on these subjects. A number of other interesting questions brought about lively discussions. This feature of the convention was pronounced by all to be helpful and instructive and aroused no little enthusiasm.

F. G. Dickson, president of the Federal Telephone Company of Cleveland, was called upon for a statement of affairs at Cleveland and spoke in part as follows:

Mr. Chairman and Gentlemen: After months of labor we have installed a new switchboard with an ultimate capacity of 18,000, and it is working most admirably. I doubt very much if there is another exchange in the country that is giving better service than the Cuyahoga is giving to-day. That is the uniform testimony of our customers. We had constant complaints of service in the past, but this has gone, and we hear nothing but commendation on all sides.

For two years or more past no effort was made by the Cuyahoga company to extend its plant or increase its service, because the character of the service was not what it should have been with the old board, and therefore in that time the Cuyahoga company made no growth at all. At the present we have a corps of solicitors out and we are writing new contracts at a rate exceeding 500 a month, and we are increasing the revenue in consequence. We expect to ultimately give our people a less average rate per telephone than we had before, while it will more than double our revenue. Our new rates for business have increased from $48 to $72, and we have had no trouble whatever in establishing those rates.

We have had a very interesting experience in the Cuyahoga company in relation to our attitude toward our employes. A year ago, very nearly, we put in operation a plan for a division of the net profits with our employes. We agreed, after interest and taxes and all expenses were paid, to lay aside 20 per cent of what was left and divide it among the employes in proportion to their salaries. Thus, for a person receiving $50 a month, his proportion of this fund would be just half what another would get who received $100 a month. If one person had been in the employ of the company for five months out of six, and another had been in our employ only one month out of the six, the first one would receive five times as much as the other, if their salaries were the same. So we think this had a tendency to keep some people permanently in our employ. The object of getting this compensation would keep them at least until its distribution, and, more than that, we hoped there would be greater economy shown in the mangement, because every dollar that went for expenses, for waste, for memorandum paper, when the back of an old envelope would serve the purpose, had a tendency of making the employe pay practically one-fifth of that waste. They have begun to realize this, and we think that our plant is being more economically managed than ever before. On the first of January last we distributed something over $4,000 among our employes in this way, to the great satisfaction of all concerned, and to my great satisfaction.

In many ways we are endeavoring to get a cordial feeling of good will between the people in our employ, the officers and the employes, down to the lowest, and we think we are accomplishing our aim to very good effect. I have had some experience with people in the past, and I don't recall that I ever knew an organization where a better spirit prevailed or seems to prevail, than in the Cuyahoga Telephone Company to-day.

I find that it is quite unnecessary for me to be the first one at the office in the morning and the last one to leave it at night. Whether I am there or not, the business goes on just the same, and there is no neglect of duty any place. Indeed, the only trouble I have had is to get some of the hardest working men out of the office at all. I have had to drive them out. When Senator Hanna's funeral occurred we closed our office at noon, and notice was given that the office would be closed, when our general auditor came to my office and requested as a special privilege that he and some of his men be permitted to return; that they could not afford to lose that half day; it would interfere with their business. That is not an uncommon spirit. I find men down there late at night, and even on Sundays, on special occasions, and I am more than satisfied and pleased with the support that is being received by all our people.

I think that about covers the situation in the Coyahoga Telephone Company. We are aiming at one thing, first of all, and that is to give to the people of Cleveland the best possible telephone service. If there is anything that we can do to improve that service we are going to do it; that, with fair rates, I believe we will make it a very good money making enterprise. We have the greatest confidence in its future, and we believe it is going to be one of the best, if not the best, telephone plants in the United States. That is our purpose and we propose to make it so.

Cyrus J. Huling of Columbus, chairman of the committee on legislation, presented a complete report on the postoffice telephone fight, which was made in Washington last winter, showing how completely the Independents had gained their point. He also reported that a number of bills inimical to the telephone interests of the state were killed by himself and co-workers in the Ohio legislature at the last session. The members tendered a vote of thanks to the postal committee and the committee on legislation for their able work in behalf of the association.

Rates of service did not come in for much discussion, but the question of telephone insurance rates was discussed in detail. It was emphasized at this meeting that one of the leading purposes of the association is to make strenuous effort looking toward the securing of lower rates, even to the end, if found necessary, of forming a mutual insurance company among the Independents. As an argument in favor of a coöperative insurance association it was pointed out that the policies now carried by the various companies were worthless because they stipulated that damage caused by electrical current, either natural or artificial, was not to be considered.

The policies cover only losses by fire and do not extend to the thousands of dollars of damage that may be done to

switchboards, etc., by lightning or the crossing of telephone wires with high tension wires.

It was stated by those in a position to know that a comparison of losses on telephone properties for a few years back with those on other property will show that the risk demanded by the insurance companies is out of proportion to the losses paid. The aggregate value of the Ohio Independent telephone properties is already so vast and is increasing to such an extent that the item of insurance amounts to a large sum. To cut down the insurance cost the Independents believe will be possible only with a mutual association.

The executive committee will report at the next meeting a plan for a coöperative insurance company that will provide protection against all losses.

J. S. Brailey, Jr., representing the Toledo Home Telephone Company, was called upon for a few remarks and said:

Gentlemen of the Convention and Mr. Chairman: I think there is one matter which has not been discussed at any great length here to-day that I am glad to have the opportunity to be able to talk upon. I think it is vital to the interests of the companies here. A great many of the people who have been in the Independent telephone business the last few years have been so busy developing their own properties, and in some cases developing properties all over the country, that to a certain extent they have neglected to tie up some of the other companies that are right in their immediate vicinity. What has specially brought this to my attention has been the condition which exists in Miami county, between Piqua and Covington. In Miami county there are some 3,000 Independent telephones as against some 300 Bell telephones. The telephone systems always work harmoniously together, and have been rather in close touch with each other. But at Covington, a town of 2,000, with some 500 or 600 telephones, the Bell telephone people spent a great deal of time with them and finally got them to sign a sublicense contract under certain conditions. And there has not been a time during the last five years but that the company at Troy could have made a long term toll contract with the Covington people. A meeting was held at Piqua and the matter has not been adjusted yet, and the Covington company will probably not go over.

But at the same time it shows weakness, and I dare say there is not a county in the state where all the companies which do business by contract together but that with a little work on the part of the companies could be tied up with each other in a long term toll line contract. The larger companies in each county depend for business upon the smaller companies in those counties, and I really believe that it is the most important matter which the Independent interests of this state have before them to-day—that of seeing that contracts are made between each company and each county for toll line connections. Tie up each county together, then you are sure that no company can steal away from you and injure your interest. The Bell has begun to work for these companies, but if we don't fail the other companies will sign, and by being able to get a start can head the Bell off. Otherwise, we know they may line up several of our companies. In this instance we were able to adjust the matter.

You will find that there are gentlemen here who represent companies that never had any Bell opposition, and for the Bell company to appear before them appeals more strongly than in a county where we have had Bell opposition. In all places where the Bell has opposed us the local companies do not fear the Bell. I think it is a good thing to have Bell competition, and by having the Bell there you can always get ahead and keep your service and take care of your telephone subscribers. But that does not appeal the same way to the man who has never had Bell opposition. And the Bell comes along and says it is going to get a franchise and will scare that man. Those things have happened in several counties of the state, and, therefore, I think when you go home, if those things exist in your own county, you ought to get those contracts signed up. And those contracts ought to be at least for twenty-five years. Tie up everything in your own county, and where you are next to two or three towns, tie them up with you, and then you are absolutely certain that the Bell cannot come along and in some smooth way take away your connections. Or if you once have connection with that town and your subscribers have the connection, and they take it away, then it is very much worse. I think it is a matter of extreme importance. And then the central company can tie up with the United States, and it makes us all bound together, with toll connections. The Independent telephone field in Ohio should find all the companies standing together, and it will increase the value and good will of these other plants at least twenty or twenty-five per cent, while if you take away twenty or twenty-five per cent it destroys an additional good will which is worth money just the same as your poles and lines. Therefore, when you take away the company which has connection with you you are taking away a part of your property, and you should see that those properties are tied up to you.

We were negligent in that particular case simply because we didn't think such a condition did exist, and as I said, that company could have been tied up to Piqua at any time during the last five years. Now I think it can be done at any time, as I say, but we ought to be zealous in our efforts to tie up all the companies in the state. We have had a good many telephone companies in Ohio. We have not gotten together at all except at Cincinnati. I think the parties who called this convention to-day ought to be congratulated on doing so. There has not been a time when the Independent telephone movement has been so strong as it is to-day. We hear Independent telephone people talk and say, "Well, if we could only float our bonds." Gentlemen, I tell you that Independent telephone securities are worth more than we could expect. They are better with all than we could even ask them to be at this time. Another thing, I think you will find there will be a big change within the next year in telephone securities. People are having their attention called more and more against eastern securities. So that the financial outlook, in my opinion, was never as good as it is to-day.

A great many people have been investing their money in different enterprises, and I know some of them are directing their attention more and more to Independent telephone securities. With those conditions that confront us to-day, having driven the Bell telephone out of this territory, no one should pay any attention to the Bell company. I told some of the gentlemen at Piqua to-day that we don't care anything about the Bell telephone company. They are out of it; they are whipped. I said if they were not whipped they wouldn't make the offers to the various companies throughout the state to tie up with them that they are. If they weren't whipped they would not be around begging the Independent companies to tie up to them. That is all the more reason why you should not go to the Bell. No one should go to the Bell.

Some of you gentlemen may think that this part of the talk is not necessary, but I happen to know that the Bell people have some very smooth individuals circulating around over the state, and they tell some very smooth stories when no one is there to contradict them, and for that reason I state that no Independent telephone man to-day should listen to a Bell man for a second, for their ship is going down, and it is only a question of time when they will have to get out of Ohio as they have had to get out of other states.

The committee on permanent organization presented a set of rules and regulations for the government of the association, after which the following officers were elected by the association for the ensuing year:

President—Frank L. Beam, Columbus, Ohio.

Secretary—E. E. Knox, Portsmouth, Ohio.

Treasurer—Ralph Reamer, Columbus, Ohio.

Vice-Presidents—W. Gilbert Thompson, Lebanon, Ohio; G. P. Thorpe, Wilmington, Ohio; J. B. Hoge, Cleveland, Ohio; R. E. Hamblin, Toledo, Ohio; James C. Reeber, Dayton, Ohio; Dwight E. Sapp, Mt. Vernon, Ohio; George A. Metheany, Lima, Ohio; W. T. Laubach, Akron, Ohio; J. B. Rhodes, Zanesville, Ohio.

Committees were appoinetd on legislation, postal affairs and permanent organization.

An executive committee consisting of five members, of which the president is *ex officio* chairman, is yet to be appointed. The plan of organization is to divide the state into nine districts, each vice-president to take charge of a district and organize same so as to make complete union of interests.

The membership of the new organization will be made up of companies instead of individual members, as in the past. The membership fees were fixed at $5 for all exchanges with less than 1,000 telephones and 100 miles of toll line, and $10 for all with a larger business. Some of the members were in favor of holding two meetings each year, one in March and the other in October. After some discussion the matter was left to the executive committee to decide.

It was brought out at the meeting that there are in Ohio to-day over 147,000 Independent telephones connected up with the lines of the United States Telephone Company, and this service will be very materially increased during the next sixty days. By that time the United States Telephone Company will have completed lines connected with the West Virginia system at Wheeling and with the Indiana system at Richmond, Ind., which will give a through circuit to St. Louis, Louisville, Kentucky, and many other points. This entire matter was very carefully discussed.

Although this was the first attempt to organize the Inde-

pendent interests of the state, it was a success in every particular and the liveliest interest was manifested by all those present in the deliberations of the convention.

None of the Independent manufacturing concerns attempted exhibits at this meeting. This was due almost altogether to the fact that it was not advertised, no effort being made to induce manufacturers to make displays.

The meeting was informal and spontaneous to a certain extent. During the past few months a number of Ohio men interested in Independent telephone securities have been making trips over the country on tours of inspection, and so much interest was awakened in the general proposition that those interested found it desirable to get in close touch with the operating departments of the state and with the general situation. This, it is said, had much to do with bringing the Independent operators of the state together at Columbus.

Among those in attendance at the meeting were: James B. Hoge, Cleveland, Federal Telephone Company; Earl W. Seitz, Circleville, Citizens' Telephone Company; D. G. Gowers, Massillon, Massillon Telephone Company; W. G. Halloway, Salem, Columbiana Telephone Company; C. T. Brown, Troy, Troy Telephone Company; E. G. Miller, Warren, Warren and Niles Telephone Company; E. E. Knox, Portsmouth, Portsmouth Telephone Company; Washington Hyde, Warren, W. & N. Telephone Company; F. G. Dickson, Cleveland, president Federal Telephone Company; W. P. Bogardus, Mount Vernon, Mount Vernon Telephone Company; F. D. Miller, Alliance, Stark County Telephone Company; John McClain, Troy, Troy Telephone Company; Harry B. Gates, Cincinnati, Queen City Telephone Company; W. G. Thompson, Lebanon, Valley Telephone Company; D. M. Odoffer, Marion, Mann County Telephone Company; John T. Barlow, Dayton, Home Telephone Company; J. R. Preble, Lorain, Black River Telephone Company; A. G. Hillhouse, Canton, Stark County Telephone Company; I. S. Steward, Gratis, Preble County Telephone Company; Ralph Reamer, Columbus, Citizens' Telephone Company; Irving Hoffman, Mansfield; J. S. Brailey, Jr., Toledo, Toledo Home Telephone Company; C. E. Stinson, Toledo, Toledo Home Telephone Company; Frank L. Beam, Columbus, Citizens' Telephone Company.

EQUIPMENT WORK.

BY FREDERICK A. WEGNER.

Equipping and installing an exchange calls for considerable mechanical ingenuity and electrical skill, and a few notes on such work may not be without interest.

Generator wires and circuits, because of their disturbing influences, should be kept as far as practical away from other circuits. Also the battery for signals or lamps and the current for transmitters should be kept free from disturbing influences.

Running and placing the cables from the terminal board should be towards the cross-connecting board, for they can be better arranged in this way, being formed and fanned out at the terminal board first. From the cross-connecting board end they should be formed and fanned out and then run up to the switchboard.

Use the idea of running three cables—signal, multiple and line—onto one terminal strip, so as to bring them all close together. In laying out a cross-connecting board, design according to operator's capacity of switchboard, or, in other words, if one operator takes care of 200 subscribers in her position, then figure the signal and multiple strips of the cross-connecting board for 200 signals, 200 multiple wires, 200 line wires, or those coming from that many subscribers. Then one jumper can be used for both the signal and the multiple and also operated with sneak coil cut-out.

The battery room should be in a cellar, for the electrolyte or solution will not evaporate so rapidly there as in a higher temperature, and the temperature of a basement is, as a rule, more uniform. The batteries should be cool and dry, easy of access, not to be near or below anything that may be damaged upon the accidental spilling of the acids or where the fumes arising from the liquids can cause any damage. For this latter reason, of course, the room should be ventilated. This room should be preferably upon the same floor with the generating machinery and power board, but separated therefrom by a glass door and air-tight partition, and so separated that neither the acids or acid fumes will have any deleterious effects on the machinery.

Installation of the machinery, such as the dynamos, motors, ringing generators, etc., should be upon a rigid concrete or brick foundation about three feet six inches high, preferably an open and clear space all around from the floor up. The generators for ringing should be upon the same foundation, when a separate foundation is not practical, all parts to be easy of access. Wiring should be concealed and beneath the floor, brought up in iron-armored conduit, with special moisture-proof insulating joints. Conduit should be laid in a trench or groove under the floor.

The large charging set should have a special dust and moisture-proof hood or cloth covering, which is to be constantly kept over same when the latter is not in use. For the double set of ringing generators only one of the hoods is necessary and that is taken off from the ringer to be started and placed on the one to be stopped.

All rooms at all times should have a current of dry air circulating, and be free from moisture, also the cement floor and walls should be kept free of dirt and dust. Wiring between test sets should be as close together as possible and as economical in wire and work as it can efficiently be accomplished.

INDEPENDENT TELEPHONY AT THE WORLD'S FAIR.

The Kinloch Telephone Company (Independent) has installed at convenient places throughout the World's Fair grounds at St. Louis toll stations so as to put the patrons of the fair in communication with outside points over that system. By July 15 the line will be completed, connecting Topeka, Kansas, and all intermediate points with the Kinloch system. The last link to be built from Pittsburg to Cumberland, Maryland, thus making connection with St. Louis, will likewise be completed.

While the telephone had just been invented when the Centennial was held in Philadelphia in 1876, and long distance lines were scarcely established at the time of the World's Fair in Chicago in 1893 and the Independent system had not been thought of at that time, the Louisiana Purchase Exposition finds a very extensive Independent exhibit in the Electrical Building, including manual and automatic equipment, representing over 1,800,000 telephones in actual operation and an investment of over $200,000,000. The securities representing this investment, according to the best estimates, are owned by 150,000 stockholders scattered throughout the business centers and rural districts of the United States.

There will be no other exhibit at the Exposition that will be of special interest to so many people, no other business that has had its birth since the World's Fair in Chicago that will represent such an enormous investment, nor any exhibit that saves so much time, completely annihilating distances, furnishes so much protection and pleasure, or has done so much towards revolutionizing the life of the farmer as the telephone. All of this has come about during the past ten years since the Independent service was introduced.

DIGEST OF TELEPHONE LITERATURE

Conducted by Samuel G. McMeen.

Independent Telephone Securities.—STANTON.—*Finance, June 18.*

FINANCIAL AND ECONOMICAL.

The expiration of the fundamental telephone patents placed on the market an inferior class of telephone equipment, due to lack of experience and the existence of almost basic unexpired patents. Inexperience also affected the character of the outdoor plant and a number of remodelings were necessary to produce good service at low cost. The lack of toll lines and the harassing influence of the Bell company also acted to restrict the service and impair its character. Due to the absence of moving parts, the rate of depreciation in telephone properties is less than in manufacturing and transportation properties. Long distance speech transmission accomplishes nearly the same result as long distance personal transportation at a smaller cost to the consumer and at a very much smaller plant investment. Telephone properties operate under fewer risks and under risks of less magnitude than do manufacturing properties. Under modern conditions the investment in a conduit system provides a property so nearly indestructible as to insure a very long life. It is the conclusion of the article that telephone securities are valuable because of low maintenance expense and high earning power on a relatively small investment.

Telephone Problems in Farming Communities.—KNOWLTON.—*Electrical World & Engineer, June 11.*

After some comment on the difference in conditions of telephony between cities and more sparsely settled regions, the author presents copious quotations from a circular letter issued by the president of the Colorado Telephone Company, in which an effort is made to instruct Colorado ranchmen to the point of believing that it is not worth while for them to take steps to provide themselves with telephone service by purchasing apparatus, building lines, or by other similar methods. Coöperative country lines are pointed out as being unlikely to benefit Colorado ranchmen, but it is not shown how the interests of these ranchmen differ from those of farmers in other regions.

The Independent Telephone Movement.—WARE.—*Sound Waves, June.*

Michigan is claimed as the birthplace of the Independent telephone movement, and this is given as having begun about 1896. Six New England states have fewer Independent telephones than any one of more than twenty other states in the union. Development in New England, however, has begun. Fall River, New Bedford and Portland, with smaller cities, give evidence of future great development. Independent development in New York state has made great strides in the last two years. All of Ohio, with the exception of Cincinnati, is occupied by Independent exchanges and toll lines. Much valuable information is contained in the article.

Trinidad, Colorado, Telephone System.—*Electrical Review, June 4.*

EQUIPMENT.

An illustrated description of the system of the Colorado Telephone Company in Trinidad.

St. Petersburg, Russia, System.—*Western Electrician, June 18.*

The new system is to have a capacity of 40,000 lines, and will be of the divided multiple type. There will be two switchboards of 20,000 lines each. At each station the telephone will be provided with two push buttons so that by pressing one or the other one's call may go to one switchboard or the other as required by the character of the particular number. If one makes a mistake and calls the wrong office, he can immediately correct the error by pressing the other button. Hanging up the receiver effaces whatever signal is being shown. The circuit accomplishing these things is the invention of Edwin H. Smythe of Freeport, Illinois, for patent office purposes, but really of Chicago.

The Janus Telephone System.—GRADENWITZ.—*Telephone Journal, June 4.*

A description of a telephone system much used in Germany and intended to provide a method of communication between the stations of private groups of subscribers without calling through a public central office. The article describes the method of operation, and illustrates the switchboard and the telephones. In this country the same end is reached by connecting both of the small groups by trunks to a public central office.

The Care of Telephone Storage Battery Plants.—SPENCER.—*Telephone Journal, June 4.*

To eliminate batteries at subscribers' stations accomplishes a reduction of expense and an improvement of service. A telephone exchange power plant should consist of a switchboard equipped with measuring instruments and switches, devices for converting mechanical or electrical power bought or produced, into power for charging the storage battery and operating signal circuits. Purchased electric power is almost never at a voltage enabling it to be used directly for charging the storage batteries of a telephone system. Often also it is alternating current; the power plant in the telephone office transforms it to such a voltage as will enable the central office batteries to be charged with the greatest economy. The battery is the most likely portion to suffer from improper care. Positive differ from negative plates in color and in the hardness of the coating. Wrong rates and degrees of charging cause the plates to buckle and the active material to fall out, causing loss in efficiency of the plates and damage by short circuiting when the sediment grows high enough. The article contains extensive quotation from the instruction and data sheets of a large battery company, and is continued.

The Telephone.—TAYLOR.—*Sound Waves, June.*

The sixth of the series and treats of the magneto generator, describing the best forms of magnets, pole pieces, armatures and windings. It is pointed out that the requirement of the winding is that it shall contain as many turns as possible with the least resistance. The customary means of rating bridging and series generators is analyzed to advantage.

Electric Soldering Iron Cord Reel.—DORWIN.—*Telephone Journal, June 4.*

A detailed description, with drawings, of such a device, enabling the soldering iron to be carried where needed, and the slack of the cord to be cared for at all times.

Four Party Selective System.—O'BRIEN.—*American Electrician.*

A description of the Leich system, together with two tables of rates and costs of the elements making up the basis of rates. In the Leich system four systems are served by one line. So far as the signal receiving mechanism at the station is concerned, its circuit is legged to earth from one of the wires. Two of the four stations thus have ringer branches from one wire and the remaining two from the other wire. At each station a condenser is in series with the ringer. A retardation coil shunts the ringer at one of the stations on each side, and a retardation coil is in series with the ringer at the other station on each side. The re-

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sistances of the retardation coils differ in these instances, as also do the capacities of the condensers.

The result of these arrangements is that a 60-cycle alternating current will operate the ringer at the station having the retardation coil in bridge with the ringer, but will not operate the ringer at the station having the retardation coil in series with the ringer. A 20-cycle alternating current will operate the ringer at the last mentioned station, but not the other. As the alternating current may be applied to one or other of the two wires of the line, complete selection of the four stations is accomplished. The article develops the system definitely and gives the reasons for the selective actions.

Improvement in Magneto Switchboard Signaling.—LATTIG & GOODRUM.—*Telephone Journal, May 28.*

In magneto systems where stations have partly high resistance ringers and partly low resistance ringers, clearing out signals are unreliable when the signal is given from a high resistance station connected through to a low resistance station, because the latter ringer shunts the high resistance clearing-out drop which is connected across the cords. By using either of two expedients, the cord circuits may be modified to respond more readily when such mixed connections are set up, and still operate satisfactorily in other ways. Six drawings illustrate the two methods which are used, one putting the clearing-out drop in series with one strand and shunting it by a condenser, and one inserting a non-inductive resistance in each strand, bridging the clearing-out drop between a middle point of one resistance and a middle point of the other.

The Telegraphone.—Electrician, London, June 3, 1904.

Poulsen's telegraphone has been improved during the past year. The type in which the conversation is recorded by the magnetization of a steel wire being that which has been developed lately. A single motor now drives the instrument, reeling off the wire from one spool to another while maintaining proper adjustment with relation to the magnet. The wire is long enough to record a half-hour's conversation. A double pole switch with three positions provides that the telegraphone may be disconnected from the telephone, may be connected to the line for recording only, or may be connected to the line for recording while the instrument is actually in use. One may therefore call up a station, and after failing to reach his party, may leave his message on the steel wire to be heard later by the called individual.

Dry Cell Common Battery System.—TYLER.—*Telephone Journal, May 21.*

Details of the system used at Center Point, Pennsylvania, having no power plant except a group of sixteen commercial dry batteries. The conclusion is that with proper design dry batteries may be employed with success.

Divided Multiple.—BEYLAND.—*Sound Waves, June.*

An article along the line of discussion of the relative merits of the usual type of multiple boards versus the divided type. The point is well taken that the least apparatus which is left for the unskilled subscriber to handle, the more efficient the system will be, other things being equal. The particular mechanism described in the article is that installed in divided multiple boards in St. Louis, Missouri, and Cleveland, Ohio. These were of the same type and consisted of four divisions of 5,000 lines each. At each substation was a telephone set equipped with four push buttons, and a call made with one of these buttons would be set before an operator in only one of the four switchboards, although by using another button a call might be sent to either of the remaining three. The conclusion of this author, whose contribution is along the same line as that of Mr. Winston, also treated in this issue of the digest, is that the St. Louis board, which is the only remaining installation of this type, marks an epoch in Independent telephone engineering; but that it will no doubt soon have to give way to more modern methods.

Toll Trunk Circuits.—GREENWALD.—*Telephone Journal, May 21.*

Five drawings and a description of trunks between toll and local switchboards. These are of the type in which the toll operator has the supervisory signals and can ring the subscriber. The cord circuit is not universal, but has one plug for the long distance line and one to be inserted in the jack of the local trunk. A polarized relay forms a part of the equipment. When the long distance line is in use, the protective devices are cut out. Party line signaling is possible.

elective Alarm Bells.—BAUMANN.—*Zeitschrift fur Elektroteknische, May 15.*

An illustrated description of a system largely used on telephone lines in Germany accomplishing the selection of a single station without a signal to either of the others. The method in this case is that of varying strengths of current and in which there is a relation between the magnetic effect produced by the windings in the line circuit and the windings in the local circuit. In all the forms of the system there is required the coöperation of a local battery, and there is the further disadvantage that, although there is no actual ringing of the bells at the stations not to be called, there is usually a single tap unless special precautions are taken to prevent it, and these also are described in the article.

Care of Telephone Storage Battery Plants.—SPENCER.—*Telephone Journal, June 11.*

Sulphuric acid for storage batteries must be pure and must be diluted to a lower density before use. A table specifies the proportions of acid to water to get definite specific gravities. These and readings on the Baume scale are given, so that the reader may use either type of hydrometer scale. Details of protection from acid damage and of rates of charge of the cells close the article.

Four Division Telephone Exchange.—WINSTON.—*Sound Waves, June.*

After describing the details and magnitude of standard multiple boards and their relation to the amount of trunking out of one office into others, Mr. Winston calculates the large portion of the investment which goes into multiple jacks of a city equipment. He develops this phase of the matter to show how the conclusion is reached that the multiple before the subscribers' operators may well be abandoned, retaining it only before the incoming trunk operators. With this arrangement all calls will be trunked, even though the lines to be connected terminate in the same office. The advantage of a multiple will exist in the trunking sections only. It is also developed that an advantage was believed to be possible by dividing the lines of a given office into several groups, and two such boards have been built, the number of groups in each being four. One of them was in Cleveland, Ohio, and the other in St. Louis, Missouri. The former has been abandoned, and the latter remains. In each case the subscriber, in calling, controls the destination of his call among the four separate switchboards. The subscriber's telephone contains four buttons, the use of either one of them throwing the call into the corresponding switchboard. The article is a full showing of these details, and concludes that, for reasons which are given, the system is ingenious, but not unsatisfactory.

An Automatic Private Line Extension.—KISSELL.—*Telephone Journal, June 11.*

A method whereby one of the stations on a party line may signal another without calling the central office. The method of accomplishing this frequently needed result is not made quite clear because the descriptive matter refers to letters and figures in the drawings, while these are not reproduced in the cuts. It is evident, however, that a call for the central office is made by removing the receiver from the hook and by nothing more; while a call for the remaining station, if the line be desired for use as a private line, is made by pressing a button and at the same time taking down the receiver.

Military Line Work.—TYLER.—*Telephone Journal, June 11.*

LINES AND LINE CONSTRUCTION.

A note upon the advantage of telephone and other signal circuit construction in military performances, including details of a pole climbing contest of the Military Athletic League of New York. Members of the National Guard are becoming expert in this branch of construction.

Protection of Telephone Lines When Near High Tension Lines.—CHETWOOD.—*Electrical World & Engineer, May 21.*

Under a longer title, an article inspired by the previous one by Knowlton. Further details of mechanical and electrical protection involve the use of heavy grounding conductors, steel cross arms and various forms of guarding spans. Six drawings illustrate the conditions specified and methods to be used when the high potential lines cross above and when they cross below the telephone lines. The arms and pins of the power poles are of steel and are grounded, and special steel guards extend from the poles. High tension above and low tension below is the preferred method. At other than a short one, the telephone span is protected by heavy stranded rope strung from top to top of the poles of the telephone span and carried to ground at the base of each such pole. This is supplemented again by a screen of galvanized iron wires between pins of the cross arms in this span alone. Below are the line wires. Other forms of screens and grounded networks fully illustrate the recommendation.

Electrolysis.—ABBOTT.—*Telephone Journal, June 11.*

Mr. I. H. Farnham first called attention to corrosion of cable sheaths through electrolytic action and pointed out why the damage was caused. This author states that the damage likely to be caused by such destruction of underground pipes was first overestimated, but that it still is such a menace as must be offset by proper procedure in the way of prevention. Photographs illustrate an examination in St. Louis which resulted in a report by Mr. Brownell to the Water Commissioner. The electrical condition of the earth in the territory occupied by the cables may be determined by tests between the cables or pipes and the surrounding earth, taken by an inspector with a voltmeter. Another method utilizes the network of the telephone system to enable the potential of the earth to be determined and maps drawn to record the conditions. From these maps the plan of cure may be laid out. There are two ways: One to eliminate the dangerous potentials by connecting the cables with the power system causing the trouble, the other by grounding the cables at the danger points. As the ground connection in this case will be destroyed while preserving the cables, it must be renewed from time to time. Two maps, one of an electrolytic survey of Toledo, Ohio, and one of Columbus, Ohio, further illustrate the article.

Strength of Wooden Insulator Pins.—WILDER.—*Sound Waves, June.*

A comparison of results of tests on insulator pins of locust, hickory, oak and other materials, locust showing the greatest and oak the least strength. The tests were made in a machine under conditions which would exist in practice, and it is announced that other tests will be made over a larger range of sizes and reported upon.

Instrument Setting.—WILHELM.—*Telephone Journal, May 21.*

A further installment of the serial, this portion treating of the drop wires, these being the conductors from the regular line support to the premises of the subscriber. Six drawings show details of taking off the pair from the cross arms and insulators, methods of supporting the pair on trees, and also show details of insulators. Practical instructions treat the entrance of the drop to the building, covering size of holes and the methods of making them.

Recent Submarine Telephone Cables.—BREISIG.—*Elektrotechnische Zeitschrift.*

During the last few years several submarine cables have been laid particularly designed for the purpose of transmitting speech. In these cables was used the insertion-of-inductance method of Pupin. A cable between Germany and Denmark serves to connect the capitals of these kingdoms, and is described, with others, in admirable detail. The structural features of the "loading coils," as they are called in this country, and the details of conductors, insulation and sheath accompany the mathematical setting forth of the design of the cables. Five cable cross sections, two curves and five tables of electrical dimensions further describe the work.

The same subject is covered in L'Electrician, May 28th, and Revue d'Electricite of the same date.

The Telephone Appreciated.—*Editorial, Electrical Review, May 28.*

OPERATING.

A comment upon the present degree of convenience offered by the telephone, being prompted by an incident in which a club secretary was enabled to reach all of the thirty-five members of the organization on an important matter in such a time as could not have been possible with any other means of communication.

Train Dispatching.—*Street Railway Journal, May 21.*

The Rochester & Eastern Rapid Railway Company provides its lines with a metallic telephone circuit carrying branches to boxes on poles at selected points. A portable telephone set may be used in connection with these boxes, or a connecting pole used to tape the line between boxes. As a result of this equipment, the rolling stock is under reasonable control from headquarters.

Suburban Lines and Extensions.—FENNELL.—*Sound Waves, June.*

Some comment with figures on country line methods. Valuable information is given with reference to arrangements for the construction, operation and accounting. It is concluded that the construction methods and the supervision of maintenance should be under the complete direction of the company operating the local exchange.

The Peg Count in Central Office Operation.—O'BRIEN.—*Telephone Journal, May 21.*

The first of a series pointing out the value of periodical peg counts with a sample curve showing proportion of trunks to calls. The curve indicates clearly the increasing efficiency of trunks in various numbers per group. A group of four trunks has a capacity of twenty-five calls per trunk per day, whereas in a group of fifty trunks, the unit capacity per trunk is more than four times that large. These statements are made: 1,600 to 1,800 flat rate calls per position per day is a safe assumption. In measured service working, if ticketed, the total per position per day is less, being about 800. Toll devices for charging calls with less labor than by ticketing, increase the efficiency of message rate or measured service operations. Pay station calls are not usually timed, but in New York it has been decided best to do so. When timed, 500 such calls constitute a day's work. There are three classes of trunks between offices: circuit, ring-down and common trunks. The first mentioned is that generally used between the offices of a central battery system. If the traffic between the offices is small at the heaviest, either the second or the third type may be used. Circuit trunks are multipled before the subscribers' operators of one office and terminate in plugs at a position in the other; 28 to 32 trunks are assigned to a position at the incoming end. Peg counts should contain as much detail of operating conditions as possible.

Managing Inspection Departments.—COAR.—*American Electrician, June.*

The qualifications which should be possessed by the chief inspector, the wire chief and the inspectors and repair men are outlined; a wider dissemination of detail information than is usually practiced is necessary for the proper education of the men. This detail information might well be issued in the form of bulletins covering specific phases of the company's work. Not the least advantage of this method is a feeling of satisfaction and interest, without which the best results are not possible. The assignment of

districts increases the feeling of responsibility and improves the results thereby. Complete records of the wires of every line are indispensable. Such a record should provide that each cable shall be identified as to its route and places of termination, the relation of the various terminals to each other, class of service, conductor numbers and switchboard numbers; a card index is the best means of keeping such a record, and entries should be made in ink. Pole diagrams, trouble records and trouble slips are described, a sample of one of the latter being reproduced in the article.

The Berlin Telephone System.—Electricity, London, June 3.

It is stated that the number of subscribers now connected in the Berlin telephone system is 73,000, which means an increase of about 10,000 during the past year. Of this total about 11,000 are in the suburbs, the city of Berlin proper having about 62,000. Sixty per cent of the growth of last year, therefore, is in the city proper. Over 12,000 stations are connected to the main office.

GENERAL TELEPHONE ENGINEERING.

Bell Long Distance Lines.—Electrical Review, June 4.

A map of the lines of the Bell company and its licensees. Certain figures from the annual report of the Bell company accompany the article, which is devoted to a comment upon the relation between productive population and telephone development.

Conventional Signs for Draftsmen.—d'ROMTRA.—*Western Electrician, June 18.*

Conventional signs used by German, Austrian and Italian engineers and draftsmen are different from those used in this country. This article gives a list of the more important signs, and a short recital of abbreviations. A number of the signs are important in telephone work, and until an international system of conventionals is established, certain persons will find it of advantage to know as many of the systems as possible.

Telephone Engineering.—KELSEY.—*Electrical Review, June 4.*

The sixth article of a series. In the beginning of Independent telephony, the greatly enhanced development in Bell exchanges called for new and improved methods, forcing the very rapid preparation of the common battery system. When it went into service it contained some faults which the author points out in detail. These had to do with cross talk between operators and disturbances on lines. In this installment of the series the differences between the single voltage and multi-voltage systems are described. In the former all currents for lamp signs, the operation of relays, and all transmitters, are derived from a single source of about twenty-five volts. As described, the source is said to consist of ten storage cells in series, and an extra cell, which may be switched into and out of service in order to avoid too high a voltage during charge. It is understood that later boards eliminate the necessity of switching this end cell. A notable feature of the installment is that the office of the condenser in the substation set is analyzed and is compared with the use of a local battery.

Telephone Systems.—London Electrician, May 27.

Messrs. Poole and Webb contribue additional items of discussion along the line of Mr. Bennett's paper on corporation telephones.

Underground Construction.—HANCOCK.—*Western Electrician, June 4 and 18.*

This paper was awarded the Doherty gold medal. It deals most directly with underground construction for the distribution of power, but is notable in that it deals with the problem in a complete and detailed manner. Much of the matter is applicable to construction of quite a different character. Details of making preliminary and actual surveys in making estimates and in executing the laying of duct pavement are handled in a masterly way.

Progress of Long Distance Telephony.—Western Telephone Journal, June.

A historical statement of progress. The first long line between communities was constructed between Boston and Lowell, Massachusetts, in 1879. The distance is twenty-seven miles and the line was a grounded circuit. The public failed to recognize the great significance of the achievement and regarded it as an experiment until an important business transaction was concluded by a conference over the line, and the publicity which resulted from newspaper comment awakened interest in such telephony. Copper wire was first used in 1884 and a large number of copper metallic circuits between cities was first inaugurated by the lines between New York and Philadelphia. In 1892 the New York-Chicago lines were opened and in 1893 occurred the formal opening of the Boston-Chicago service. While the Bell company produced the first extremely long lines, the greatest and most rapid suburban development has been made by the Independent interests. Fifty million people are within reach of the telephones of the Independent and Bell systems.

Kansas City Independent System.—Telephone Journal, May 28.

Kansas City, Missouri, and Kansas City, Kansas, have together a population of 300,000, of which 9,000 are subscribers to the Independent service. Growth is going on at a rate of 40 telephones per day. The plant has multiple duct conduit to the extent of 750,000 feet. There are four offices; one in the business center of the city, two branches in the Missouri and one in the Kansas town. Two hundred pair No. 19 gauge cable is used.

Unusual Lightning.—DOBBS.—*Telephone Magazine, May.*

A recital of damage to a grounded wire telephone line carrying nineteen stations, in which instance a tree on the line was stripped of bark, a horse and a cow were killed, and a large part of the line wholly destroyed, while the telephones, protected by carbon arresters, were left wholly uninjured. The comment is upon methods of connecting arresters, and the influence of spirals in wires upon lightning discharges.

Frequency and its Effects.—KELSEY.—*Sound Waves, June.*

A clear exposition of the influence of frequencies upon things having to do with telephony. Currents for speech transmission, for the ringing of bells, air waves in sound production, have frequency as their fundamental characteristic. In several forms of party line signaling, frequency makes possible the selection of one station among a number. In the Leich system the relation of frequency to inductance, and in the Dean system the relation of frequency to mechanical inertia, enables this picking out of the right station. Frequency governs the design of repeating and induction coils, used as important parts of telephone systems.

Exchange Troubles.—WEGNER.—*Sound Waves, June.*

A further installment citing the kinds of troubles in a common battery system, part of the matter being in the form of questions and answers illustrated by drawings.

Telephony and the Patent System.—Telephone Journal, May 21.

The article claims that the Bell Company undertook to make use of the patent office system in a manner entirely foreign to the intent of the framers thereof. The system was employed to restrict invention to prevent competition, and the effect has in some degree reacted.

Exchange Maintenance.—FENNELL.—*Telephone Magazine, May.*

Independent telephone companies have often overlooked in accounting, allowance for maintenance and depreciation, although most other industries provide for it. This author includes depreciation in his consideration of maintenance. Kinds of material and apparatus, as well as character of workmanship, effect rates of maintenance and depreciation. The protective system is an important item. In arriving at rates for charging depreciation, the system should be considered in its parts, the greatest allowance being made for those parts which last the shortest time before requiring to be replaced. Aerial lines depreciate more rapidly

than those in a conduit system. Rates of depreciation increase as the age of the property becomes greater.

Chicago Subways.—PELLISSIER.—*Worcester Polytechnic Institute Journal, May.*

The system of the Illinois Tunnel Company, inaugurated February 11, for freight traffic, telephone and telegraph cables; early in the construction it was found that maps of the city were not nearly enough correct to allow the work to go on. A complete new survey of the required district enabled proper maps to be produced. The terms of the franchise provide that the tunnel system becomes the property of the city in 1929, or before if a year's notice be given by the city after twenty years from the beginning of the term. The city has privileges for its wires, and exacts 5 per cent of the gross receipts for ten years, 8 per cent for ten years more, and 12 per cent for the balance of the term. Fifty miles of tunnel must be in operation at the end of five years, and facilities must exist for twenty thousand telephones. Five miles of tunnel are already done. Standard dimensions are 12 feet 8 inches high by 14 feet wide for the larger, and 6 feet by 8 feet for the smaller tunnels. The minimum depth below the street surface is 24½ feet. Most of the work is at a deeper level. Hard clay is the material met throughout the excavation, and there is almost no trouble from seepage, although the tunnels are below lake level. All the excavations was done under air pressure. The tunnels are lined with concrete, never thinner than 10 inches and in some places 21 inches thick. Cars are to be run by 250 volts continuous current. All freight yards and all large business buildings will be reached. The tunnels cost $20,000 per mile. Telephone service uses Strowger automatic apparatus, and about 7,500 stations are connected.

Technical Training.

Telephone periodicals generally continue to present in whole or in part, Mr. Damon's paper presented to the Western Society of Engineers. Much valuable comment has been drawn out, but without yet settling the important question as to the value of college education as a preliminary to a technical life work.

Fault Location in Low Tension Networks.—GROVES.—*Electricity, London, May 6.*

One of seven methods uses a telephone receiver which is in circuit with a coil which is carried over the route of the faulty underground cable. During the test an alternating or interrupted current is passed through the faulty conductor. During this exploration sounds are heard in the receiver until the fault is reached, when the sound diminishes or dies away, enabling the fault to be uncovered and removed.

Invention of the Telephone.—Canadian Journal, May.

The telephone was invented thirty years ago this summer. Prof. Alexander Graham Bell, the inventor, communicates with the Brantford, Ontario, Board of Trade, saying that the invention was made during his visit with his father and mother in Brantford in 1874. The first real transmission of speech over an out-of-door line was in Brantford in the fall of 1876, but was transmission in one direction only. The writer states he was born in Scotland and came to Ontario in 1870. He was a British subject all the while the telephone was developing, although he had taken out first naturalization papers in the United States.

Corporation Telephones.—Electrical Times, London, May 19.

A full report of the discussion of Mr. A. R. Bennett's paper under this title, read at a previous meeting of the Glasgow section of the Institute of Electrical Engineers. Mr. Herbert Laws Webb analyzed the variety of methods which the Glasgow corporation has utilized in three years, these methods numbering six. The use of series jack contacts, seriously proposed by Mr. Bennett, was treated by Mr. Webb in comparison with bridging methods, and some answer was made to Mr. Bennett's criticism of cut-off relays. Better service and higher development constitute the only way in which a competitor for telephonic preference may win the path toward this goal, and this path is by good engineering and the study of telephonic problems. Mr. Gill furnished statistics on relay troubles, showing them to be small. Mr. Eastman seemed to prefer systems in which no relays are used, believing that the relay is as yet an unperfected item of equipment.

Telephone Used in Laying Submarine Mines.—Journal of U. S. Artillery.

An arrangement of two portable sets, each having a transmitter and a receiver, and associated with a line, one of the telephones being intended to be carried in the boat and the other used on shore.

Telephone Engineering.—KELSEY.—*Electrical Review, May 21.*

The fifth of a series, and treats of trunks between offices of a central battery system. The type of trunk line described is that used in the Bell systems, two of its phases being illustrated and described in entire detail. The first described is that which operates the signals over one wire of the trunk by the application or removal of a ground at the end of the trunk, at which are located the features of the mechanism designed first to respond to the changed condition. In that phase of the system, one wire serves to operate signals to the called from the calling office; the other wire serves to operate signals to the calling from the called office, the reason in the latter case being the movement of the switch hook at the calling station. Because of the existence of considerable differences of potential between earth points in a city having heavy traction service, there are objections to this plan, so that another described in the article has taken its place. In this, the signals depend upon the existence or absence of potential across the trunk, and grounds are not used as an element of the signaling. Both the phases of the trunk circuit are described as utilizing two different and separate sources of energy in each office. The article makes clear that current for the subscriber's transmitter is supplied to him from his own central office, whether the connection for conversation was originated by him or by someone else. So far as speech transmission is concerned, therefore, the trunk line conductors carry voice currents only, and do not carry continuous current for transmitter supply.

Wireless Telephony Using Selenium Cells.—GRADENWITZ.—*La Revue Technique, May 10*

A further article upon the Ruhmer method of transmitting speech by the use of an electric arc in the focus of a parabolic mirror, this arc being affected by an undulatory current from the telephone transmitter, the rays being collected at the receiving station in another mirror in the focus of which is a selenium cell. Transmission of speech by this method is possible through considerable distance, the separation between the transmitting and receiving stations depending upon the following things:

1. Upon the quality of the microphone employed.
2. Upon the strength of the current used with the microphone.
3. Upon the character of the superposition of the oscillations of the microphone current upon the current supplying the arc lamp.
4. Upon the intensity of the current supplied to the arc lamp at the transmitting station.
5. Upon the accuracy of the parabolic mirror of the projector.
6. Upon the precision of the adjustment of the positive crater of the arc into the focus of the mirror, as well as upon the accuracy of aiming the projected rays toward the receiving apparatus.
7. Upon the transparency of the air.
8. Upon the size of the reflector in the receiving apparatus.
9. Upon the sensibility and inertia of the selenium cell.

10. Upon the sensitiveness of the telephones.

The article is illustrated by four photographs, one of which contains a portrait of M. Ruhmer using the apparatus.

Cooperation Among Engineers.—Canadian Electrical News, May.

In an editorial concerning central station work, it is commented that much inconvenience and real danger is caused by improper accommodation for apparatus, and by unsuitable provision for locating and installing the cables and conductors between the different elements of apparatus. In any prospective installation, a consideration of all of the requirements of the plant and the proper arrangement of its parts should be undertaken and completed before any attempt is made to design a building. This building should then be laid out to conform to the requirements as determined. The coöperation in question is that which should exist between the architect, the civil engineer and the electrical engineer, whose energies ought to be directed to any case involving their kinds of work.

WEATHER FORECASTS BY TELEPHONE.

BY MATTHEW C. SMYTHE.

Among the wonders of modern civilization is the delivery of weather forecasts by rural telephone. Nearly 40,000 farmers in Iowa are daily receiving weather forecasts by telephone. This has been accomplished through the efforts of Dr. George M. Chappel of the Iowa weather bureau, who inaugurated the system last July, with but 7,554 farmers on the list. Every week he is adding between 200 and 400 names.

With this list Iowa stands at the head in the wire service and has stood at the head since last July. At that time Missouri was delivering forecasts by telephone to 3,640, Illinois 3,530, Arkansas 4,325, Ohio 2,249, New York 458 and Massachusetts 12. Each of these states has in the past year greatly increased its forecast service, while several new states have been added to the list.

There are but three states in the country which deliver forecasts to a greater number of farmers by rural delivery than Iowa. Ohio delivers in this manner 14,292, New York 10,454, Massachusetts 10,125, while Iowa is fourth in the list with 9,037.

The forecast is telephoned to central stations every morning and there the operators call up a rural telephone line. They wait a minute until all have had an opportunity to get to the telephone and then hang up the receiver. Should one of the farmers miss the call he can call up one of his neighbors and learn what it is.

The system, it was demonstrated last fall, was highly satisfactory to farmers and now that the working season has come hundreds are calling for the service. Dr. Chappel expects by this fall to be rendering service to every farm in Iowa where there is a telephone. This plan, it is said, has had much to do with farmers installing telephone systems. The forecasts are received so much sooner that it is worth the price of a telephone, many say, to get them early in the day.

In Ohio the weather-forecast-by-telephone system is also in full working operation and more than 40,000 farmers are receiving these bulletins at the present time. The following circular letter, which was recently issued by J. Warren Smith of Columbus, Ohio, director of the Ohio weather section, is self-explanatory:

The general manager of the United States Telephone Company, appreciating the value of the daily weather forecasts and warnings issued by the weather bureau, and recognizing the benefits that may be derived by its patrons from a knowledge of the information contained in the forecasts, will on Monday, June 6, begin a free distribution of the daily weather forecasts from Columbus, Sandusky, Toledo and Dayton to all their connecting exchanges. The service was begun at Cleveland some days ago and has been found of such value as to warrant their action in extending its benefits to all their lines.

The forecasts are issued by the weather bureau at about 9 a. m., giving the probable weather for the coming night and next day. It will be promptly telephoned to the long-distance office in each of the five cities named. The operators there will telephone it promptly to the larger centers and from there it will be further distributed to all the smaller exchanges. All this is without expense to the bureau or to the patrons of the lines.

The territory for which Mr. Smith has arranged extends from Hardin, Champaign and Clinton counties on the west, Crawford, Coshocton and Belmont counties on the north to the Ohio river on the south and east. It covers forty-four counties, in which are 119 local telephone exchanges.

Hundreds of farmers, fruit growers, market gardeners and business men are already availing themselves of this opportunity, and hundreds of others will do so as soon as they learn of the plan.

Now that the United States company has taken the initiative and found its clientage is increasing by reason thereof, it is not improbable that this free service may be extended over the entire state in a short time.

Between 6,000 and 7,000 farmers in Indiana, who live remote from city or town, are now receiving the daily weather forecasts of the government weather bureau by telephone. The agricultural sections are now the bureau's principal field of operations. The rural free delivery of mail opened the way for reaching the farmers promptly with the forecasts, and, with the extension of telephone systems to rural communities, another and still quicker facility for reaching the farmers was taken advantage of by the bureau.

The weather forecast is now given by telephone to about every part of Indiana that can be reached in this way. The service has recently been extended to the extreme northern part of the state. To this section it is first sent by telegraph from Indianapolis to La Grange, and by telephone from La Grange to Shipshewana. From Shipshewana the forecast is telephoned to all patrons of the rural service centering in that town, and also to patrons of the Millersburg and Middlebury systems. Among other large towns of the state that receive this service for transmission to the patrons of the rural telephone lines are: Butlersville, Columbus (which in turn supplies eleven villages), Greensburg, Holland, Loogootee, Milligan, New Augusta, Newcastle, Owensville, Vevay, Thorntown (through which 950 subscribers are reached), and Shelbyville. Promptly at 10 o'clock each morning a call is rung simultaneously for each patron of each rural system. The operator at the exchange then announces the weather forecast to all the patrons of the line at the same time.

The government is not doing much at this time in a financial way toward getting the forecasts to the farmers. In Indiana, for instance, without any expense to the government, 300 are supplied by railroad trains, 2,500 by mail, 6,000 by rural free delivery and nearly 7,000 by telephone. This service is all gratuitous.

The weather bureau has not found it possible to get the morning forecast out in time to catch the rural delivery carriers. As a rule the forecast that goes to the country is the one that is made in the afternoon. Under the circumstances the bureau is inclined to look on the local postoffice and the rural telephone as the best means for reaching the rural districts, favoring the latter. In Indiana, it is announced, the morning forecasts are now being mailed to every postmaster in the state that can be reached from the distributing center in time to make the information of benefit.

In many sections of the state accommodating postmasters, co-operating with local telephone exchanges, communicate the forecasts to the farmers. With rare exceptions, it is said, the local telephone companies in Indiana gladly give the service without pay when asked to do it.

The Great Northern Railroad Company is extending telephone lines at various points between stations on its lines.

Strowger Automatic Telephone System

F. LUBBERGER

We are living in the era of exchange building and rebuilding. In every case the question arises: What system shall we introduce? There are some newcomers in the telephonic field—the automatic systems—and it seems to be worth while for a manager to take automatic systems into consideration. There is one disadvantage on the automatic side, the systems are technically hardly known,

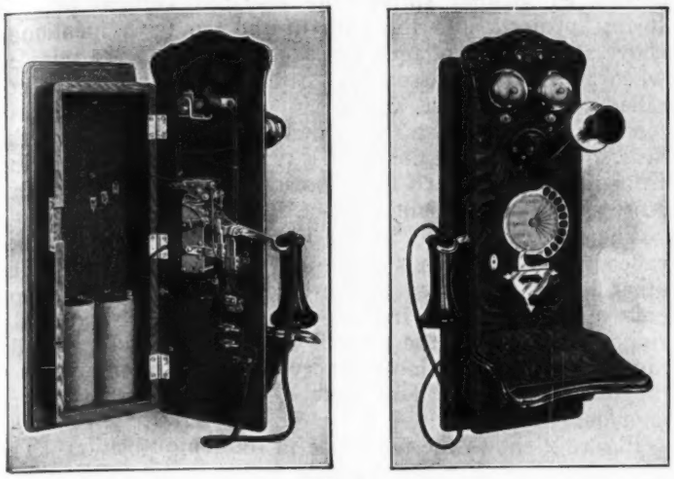


FIG. I.

while every telephone man knows all about magneto and central energy boards. Surely he can study all automatics in the respective patents. But such a patent with its twenty or thirty pages of description takes too much of the manager's time. There are descriptions of the different systems in the numerous telephone magazines, but they always stop right where things are getting interesting. There are automatic exchanges scattered around in different states, which

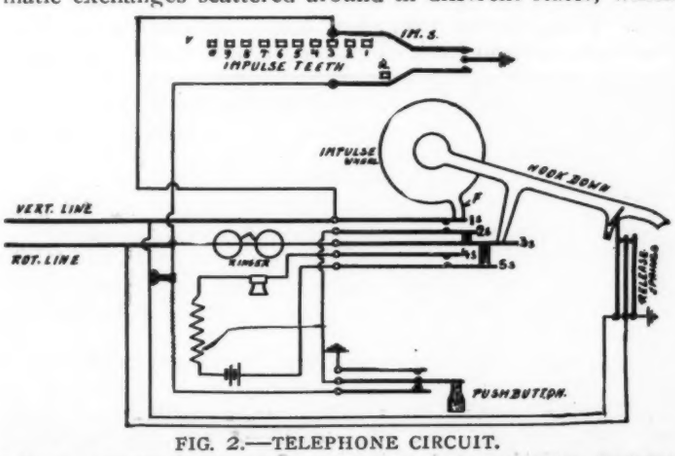


FIG. 2.—TELEPHONE CIRCUIT.

1 M. S., Impulse Spring; 1 S, 2 S, 3 S, 4 S, 5 S, Talking Springs; F, Finger Engaging Talking Springs.

show how things are going, but a telephone man is never satisfied with an apparatus alone; he wants to know the vital points—the circuits.

There are two classes of automatic telephone systems. The one imitates the manual system by connecting greater or smaller groups of subscribers on one machine, and providing only one switching mechanism for each group. The other class departs entirely from the manual practice by giving each subscriber a separate switching mechanism. The representatives of the first class (which may be called the group switching class) claim that too many mechanical parts enter into the exchange if each subscriber is to have his own "operator," and claim above all less first cost for their systems. In looking over the systems of this class a common characteristic may be found in the switching proper being done by regular motors, some circuits being switched by magnets and their armatures. Very essential parts are continuously rotating shafts and wheels of heavy machinery.

The main claim of the representatives of the second class, which may be called the individual switching class, is that each subscriber will be absolutely independent from all other subscribers. For if a machine common to a group of subscribers is working for one of the groups, all other subscribers in the group have to wait until the machine has completed the other man's call. In case of a breakdown of one switching mechanism only one subscriber's line is in trouble in the individual switching system, while a whole group is cut out in the group switching system. The multiplicity of apparatus is disclaimed by the statement that each subscriber's mechanism is merely a repetition of the other one's and may be manufactured at a comparatively small cost by up-to-date machinery.

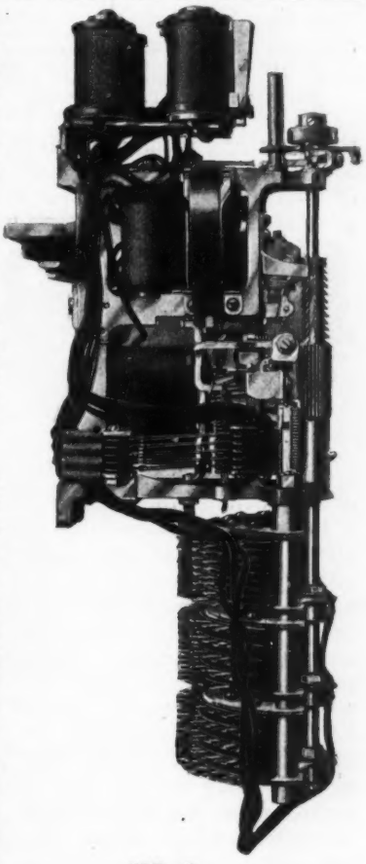


FIG. 3.

It is absolutely not the intention of the writer to discuss the merits of the group and individual systems, nor to go into any investigation as to which might be the system of the future. If in the following lines the stronger system is treated it is done so because the writer is best acquainted with this system and because he thinks the time is ripe for discussion of the technical part of automatic systems. The Strowger system belongs to the individual switching class. A few remarks about the history of the system may be welcome.

Almon B. Strowger took out the first patents early in the '90's. In 1892 Alexander E. Keith was interested in the system, and on November 3, 1892, the first Strowger exchange was opened at La Porte, Indiana. The outfit was then undeveloped and it required five wires between the subscriber's station and the exchange. In 1894 two brothers, Charles J. and John Erickson, joined the force of inventors and in the fall of 1894 a switchboard for 200 lines was put in at La Porte, Indiana, replacing the older one. This exchange was rebuilt again in 1895 by putting in another style of apparatus, characterized by wires stretched over a board, like cords of a piano, and by a revolving shaft with contact arms arranged in a helix around the shaft. After this nothing was done until 1897. By this time a machine was developed resembling in all vital parts the

machine of to-day. The first exchange equipped with this style was erected in Augusta, Georgia, in February, 1897, followed by the one at Auburn, New York.

These systems have been improved by a new feature—

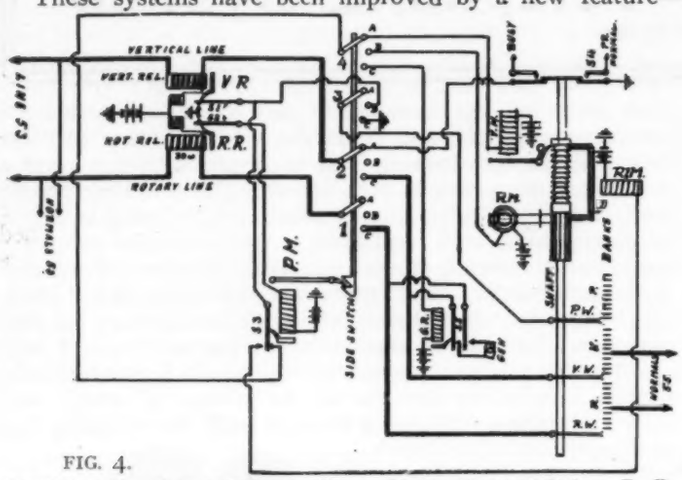


FIG. 4.

Connector No. 53 in starting position. V. R., Vertical Relay; R. R., Rotary Relay; P. M., Private Magnet; G. R., Generator Relay; R. M., Rotary Magnet; V. M., Vertical Magnet; Rl. M., Release Magnet; P. W., Private Wiper; V. W., Vertical Wiper; R. W., Rotary Wiper; S 1, S 2, S 3, S 4, S 5, Springs; D., Double Dog.

the automatic trunking system—first used in New Bedford, Massachusetts, in 1899, closely followed by an exchange in Fall River, Massachusetts. The first large exchanges were erected at the same time in Chicago and Dayton, Ohio, in the spring of 1903, and at Grand Rapids, Michigan, in the fall of 1903.

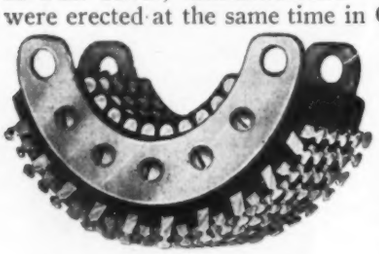


FIG. 5.

In the following discussion we refer mostly to the system as used in the newest exchanges. In a technical review later on we will discuss somewhat more closely the technical development of the mechanism of the Strowger switch.

In general outlines the Strowger system works as follows: At first an exchange for not more than 100 subscribers may be considered. The subscriber's station is connected to the exchange by two wires, and besides this ground is brought to the subscriber's instrument, which contains the regular local battery talking circuit for metallic lines, i. e., transmitter, induction coil and receiver batteries. The ground is disconnected from the lines except when the call is made. Besides the talking apparatus the calling mechanism is built into the subscriber's station. The calling device works by grounding the one or the other line a certain number of times. In the exchange the lines end in a so-called switch, which is a machine of about 4½x13x6 inches, outside dimensions. Each subscriber's line ends in a separate switch, so that there are as many switches as there are subscribers. The subscriber gets the connection by working his calling device and the connection is made in the time the subscriber is occupied by his calling.

The subscriber's calling device is built on two base plates held apart by studs, one of the plates being fastened to the door of the telephone box. A shaft extends through the base plates, projecting on both sides. On the front end is mounted a strong clock spring and a dial with finger holes, which are numbered from 1 to 0. (See Figure 1.) Between the base plates is mounted on the shaft a section of a wheel with eleven teeth. Ten of these teeth move in one plane, the eleventh tooth rotating in a plane about one-half inch distant. Furthermore, between the base plates is a small fly wheel governor connected with the main shaft by a one to twenty gear, the object of the governor being the regulation of the speed of the main shaft. On the end of the main shaft projecting backwardly is mounted a finger, capable of engaging the set of five talking springs, as shown in Figure 2. The hook has an extension engaging the five springs on the back plate, as shown in Figure 2. An extension of another spring, the so-called vertical impulse spring, projects into the path of the ten teeth mentioned above so as to be engaged by each tooth and again released when a tooth has passed by. Still another spring, the so-called rotary impulse spring, is worked by the eleventh tooth alone. Figure 2 shows these impulse springs and the little squares indicate the teeth. When the teeth are moving from right to left each tooth presses the corresponding impulse spring on a ground contact.

The station is wired, as per Figure 2. One line, the so-called vertical line, ends at the top talking spring *1s*. The other line is connected to the receiver and secondary and ends at the second spring *2s*. The third spring closes the ringer circuit when the hook is down; the lower two talking springs close the local battery and primary circuit when the hook is up. A few more details will be introduced later on.

Figure 2 shows the telephone in receiving position. The operation is as follows: Suppose a subscriber wants to call No. 75. He puts his finger into the finger hole No. 7 and pulls the dial until his finger is stopped by a fingerstop, shown in Figure 1. In doing so the connection between the two lines is broken at the top talking springs. In pulling the number seven the rotary tooth and seven of the vertical teeth were brought on the other side of the impulse springs, as shown in Figure 2, being moved from left to right. During this motion the springs did not make contact.

The subscriber pulls his finger out of the fingerhole. The clock spring on the main shaft forces the shaft back. Now the seven vertical teeth cause the vertical impulse spring to touch the ground contact seven times, after which the rotary tooth causes the rotary impulse spring to touch the ground contact once. As the impulse springs are connected to their respective lines these lines receive ground impulses. Next the subscriber pulls five. By this five impulses will go into the vertical line, and after these one impulse will go into the rotary line. Finally the subscriber pushes the ringer

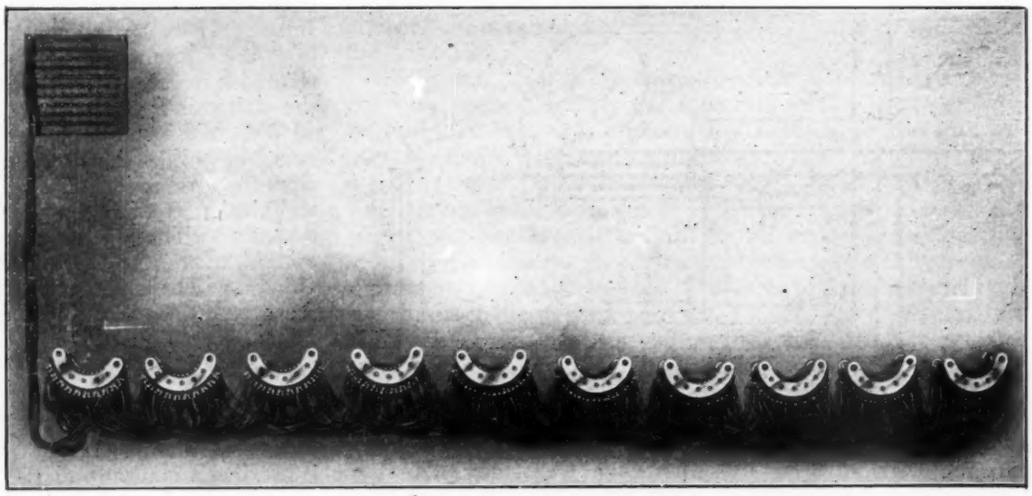


FIG. 6.—BANK OF MULTIPLES.

button. This means that he grounds the vertical line, at the same time breaking the connection between the two lines, as long as he is pressing the button. When through talking the subscriber hangs his receiver on the hook. The mechanism is designed in such a way that the hook in coming down presses two release springs simultaneously on a ground contact. The action of hanging up the receiver sends an impulse over the two lines at the same moment, when working the dial grounds only one line at a time.

Attention is called to the very important fact that whatever number is pulled the corresponding number of impulses is sent through the vertical line, and after these vertical impulses one impulse passes through the rotary line without the subscriber doing anything special for this rotary impulse.

In the exchange the lines end at a machine called a switch. Later on I will describe two different styles of switches. The one now under consideration is called a connector.

Figure 3 shows a side view of a connector. Figure 4 shows diagrammatically the wiring and the mechanical parts. The circuit is drawn only so far as to give an illustration of the principles. It may be mentioned that some details are left off, but in general it is a circuit so used in some large exchanges. In describing such a connector we describe, first, the mechanical parts; second, the electrical parts, and, finally, the operation.

The foundation of a switch is a non-magnetic metallic frame. All other parts are fastened to this frame so that a switch is a complete machine in one piece. The most important movable part is the shaft in front of the frame. A hub is riveted onto the middle part of the shaft. The upper part of the hub is milled to form ten circuit teeth; the lower part shows longitudinal teeth. The circular teeth are adapted to be engaged by a pawl fastened at the end of the so-called vertical armature. The vertical armature is controlled by the vertical magnet *V M* in Figure 4.

An impulse energizing the vertical magnet attracts the vertical armature. By this movement the shaft is lifted one tooth. After the cessation of the current the armature is drawn back by a spring not shown in the figure. The pawl slips over the next tooth and falls into the next groove. The shaft is detained by the upper arm of the double dog *D*. A second impulse through the vertical magnet will lift the shaft to a second position. As the distance of the teeth is one-eighth inch, there being ten teeth, the shaft may be raised one and one-fourth inches and may be detained at ten different positions. The longitudinal teeth of the hub are engaged by another pawl attached to the end of the so-called rotary armature. The rotary armature is controlled by the rotary magnet *R M* in Figure 4. The rotary magnet lies horizontally, as is represented by a circle. Attracting its armature, it causes the shaft to rotate one step. When the rotary armature is released, the shaft stays where it is, being detained by the lower arm of the double dog *D*. With ten impulses the shaft assumes consecutively ten different positions. This rotative motion may be carried out in any one of the ten vertical positions; in other words, the shaft is adapted to be locked at 100 different positions. The one shown in Figure 4 is the normal position, i. e., the switch when not in use.

At the lower end, the shaft carries three wipers; the top one is called a private wiper, the middle one a vertical wiper, the bottom one a rotary wiper. Each wiper consists of two blades forming the jaws of a movable knife switch. The wipers are rigidly fastened to the shaft and partake of its movements. The object of these wipers is to engage contacts in each position. It follows that there must be 300 contacts arranged in a cylindrical surface, pointing towards the inside of the cylinder. The contacts form three groups of 100 contacts each, one group per wiper. Such a group is called a bank, designated private, vertical and rotary banks. Figure 5 shows how a bank is made up. The banks are fitted on two rods screwed into the bottom of the switch frame.

The electrical outfit of a connector consists of the two magnets mentioned above, several relays and a so-called side switch. The side switch is a four-pole switch (see *1, 2, 3, 4* in Figure 4) adapted to be thrown into three different positions (*A, B, C* in Figure 4). The switching movement is made by a magnet called a private magnet, shown as *P M* in Figure 4. The first impulse through this private magnet pulls the side switch from position *A* into *B*, a second impulse from *B* to *C*. The normal position is *A*, i. e., the position of the switch at rest. Two lines come from the subscriber's station. One is called the vertical line and the other the rotary line. The vertical line passes through a thirty-ohm series relay, the so-called vertical relay *V R*, and the rotary line in a similar way passes through

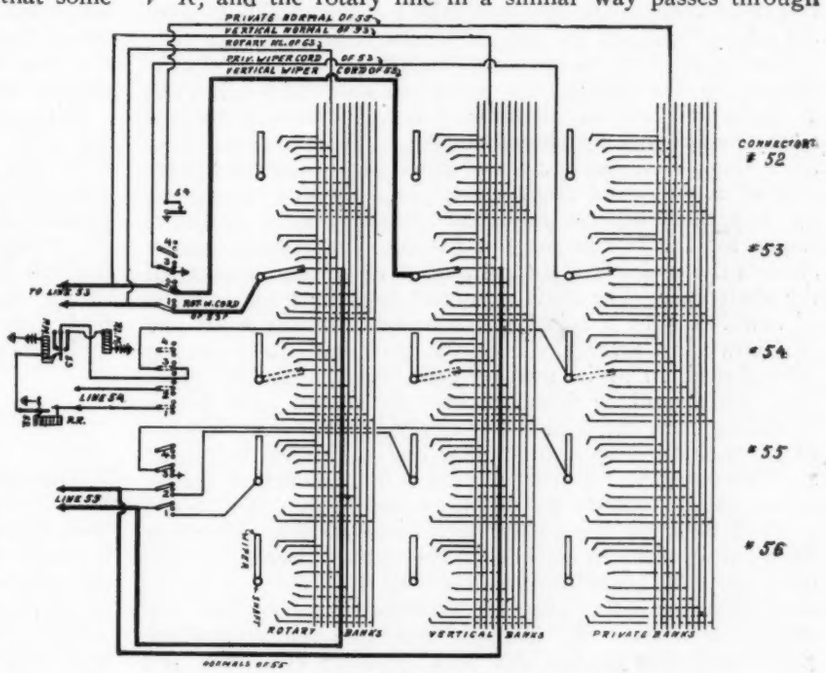


FIG. 7.—DIAGRAM OF CALLS.
Subscriber No. 53 has called Subscriber No. 55; Subscriber No. 54 tries to call Subscriber No. 56.

the rotary relay *R R*. These relays stay in the circuit all the time. A battery of fifty volts is brought to the relays through high resistance retardation coils. The vertical relay when working pushes a spring *S1* against a grounded contact and so does the rotary relay with *S2*. The spring *S1* is connected to the contact *B* of the side switch *3*, and furthermore to the double-throw spring *S3*. The spring *S2* leads to the private magnet *P M*, the other end of which is connected to battery. The normally closed back contact of the spring *S3* is connected with the blade of the side switch *4* and its front contact with the release magnet *Rl M* in Figure 4.

An impulse through the vertical relay *VR* closes a local circuit as follows: Ground-*S1*-*S3*-back contact-side switch-*4*-contact *A*-vertical magnet-*VM*-battery-ground. An impulse through the rotary relay *RR* closes a local circuit for the private magnet *PM*. Now we recall the operation at the subscriber's station. Suppose subscriber No. 53 wants to call subscriber No. 55. First, he takes the receiver off the hook, cutting out the ringer. Then he pulls No. 5—that is, he grounds the vertical line five times and grounds the rotary line once. This grounding causes five impulses to

flow from the battery through the retardation coil and the vertical relay, thus lifting the shaft five notches, then one impulse to flow through the rotary retardation coil and the rotary relay, thus energizing the private magnet. The private magnet switches the side switch from position *A* to *B*. The spring *S3*, controlled by *PM*, is pressed on the front contact, but everything connected to *S3*, being dead, will have no effect on it. Now subscriber No. 53 pulls again No. 5, i. e., the units of 55. Again five impulses flow through the vertical relay, but as the side switch is in position *B* the rotary magnet *RM* is energized over *S1-S3 4-B-RM*. After this the rotary impulse will cause the side switch to be thrown into the position *C*. Again the motion of spring *S3* has no effect. The lines are now connected to two wipers. The wipers *RW*, *VW* and *PW* engage now the fifth contact of the fifth row. Subscriber No. 55 is connected to these contacts, as will be seen below. Subscriber No. 53 now pushes his push button, grounding the vertical line. As long and as often as he pushes the button the vertical relay *VR* pulls up, closing the local circuit over point *C* of the side switch *4* and energizing the generator relay *GR* in Figure 4. The generator relay throws the ringer current on the line and calls subscriber No. 55 over the rotary bank and the vertical bank contacts No. 55.

Having finished the conversation both parties hang the receivers on the hooks. In doing so subscriber No. 53 grounds both lines simultaneously, i. e., the vertical and the rotary relays pull up simultaneously. Ground comes over the spring *S1* on spring *S3*, and at the same time the private magnet is energized from spring *S2*. By this the spring *S3* is pressed against its front contact, and a circuit is closed for the release magnet *Rl M*. The release magnet attracts the double dog *D* and pulls it out of the ratchets of the shaft hub. The shaft is rotated back over the contacts of row No. 5 by a spiral spring attached to the shaft and not shown in Figure 4. Then the shaft falls down into its normal position by its own weight. Another motion takes place which will be described only by words. The action of pulling back the double dog *D* restores the side switches to the position *A* by a mechanical link not shown in Figure 4. The complete restoring motion is finished before the receiver has completely pulled down the hook. We should proceed to study the means preventing another subscriber from cutting into an established connection. Before we can do so we must acquaint ourselves with the wiring of an exchange, remembering that an exchange of 100 or less subscribers is considered. Suppose there are 100 subscribers. Each subscriber's lines end in a separate connector and each connector has its private, vertical and rotary bank. The 100 connectors are hung on a suitable rack and all vertical bank contacts of the same number are multipled together (see Figure 6). All rotary contacts of the same number are multipled and all private contacts of the same number, i. e., contact *73* of all connectors, are attached to a line, etc.

The subscriber's lines do not only end at the proper side switches, but they are tapped by the so-called normals, i. e., pairs of wires, which lead to the vertical and rotary bank contacts of the same number. In other words, each subscriber is represented at each other subscriber's connector by a pair of contacts. The private bank is connected to the private normal coming from the spring *S4* at the top of the shaft. To the spring *S4* of connector *75* is connected to the multiple, joining all private contacts *75*. A part of this multipling is shown in Figure 7. There is represented the fifth row of the three banks of the switches, *52* to *56*. The circles in the centers of the contacts represent a cross section of the shafts; the long quadrangles represent wipers. Heavy lines show the manner of the call described above. The wipers of connector *53* are on the contacts *55* and the side switch in position *C*. The diagram shows the talking circuit so plainly that no further description is necessary.

Attention is directed to the private wiper and private normal. The side switch *3* of connector *53* being in position *C* throws ground on the private wiper *53* (see Figure 4 and Figure *7*). The private wiper *53* engages contact *55* and by this the whole multiple of private *55* is grounded.

We assume that subscriber No. 54 wants to call No. 55 while No. 53 is talking to No. 55. The connector *54* will step up five notches and the side switch will be thrown into position *B*, following the first operation of pulling five. Then again five impulses go over the vertical line and two wipers of switch *54* engage the contacts *55*, but the lines are not connected yet, as this occurs only when the side switch is in position *C*. Figure *7* shows the position of the connector *54* in dotted lines the moment before the last rotary impulse. As the whole private multiple *55* is grounded (from private *53*) the contact *B* on side switch *54* is grounded, too, and by this the spring *S3* (see Figure 4 and Figure *7*). Now the release magnet *RlM* is energized by the action of the last rotary impulse through spring *S3*, and the connector *54* is released instead of being connected to the line *55*. Now subscriber No. 54, not knowing as yet that he did not get the desired line, pushes his ringing button. This lifts the shaft again and the busy signal is thrown on his line over the point *A* of side switch *2*. Hanging up the receiver restores connector *54* to the normal position, cutting out the busy also.

Suppose now that subscriber No. 54 wishes to call No. 53, while No. 53 is talking to No. 55. Until now we have only seen how No. 54 is prevented from cutting into this connection when calling No. 55. The guard was the grounding of the private multiple *55*. In studying Figure 4 and Figure *7* we find that a connector grounds the private multiple of its own number over the spring *S4* on the top of the shaft. Connector *54*, stopping on the contacts *53*, finds this private contact grounded, and by this connector *54* is released in the same way as before.

(To be continued.)

PEACE REIGNS AT COVINGTON.

The differences between the city council and the Cumberland Telephone Company at Covington, Kentucky, have been adjusted. On account of the demand of the board for a rental of $1.50 per annum on each telephone pole within the corporate limits, the telephone company closed its office at Covington May 10. Since that date the city has been without telephone communication with the outer world, and a number of boxes had been taken out of business offices and residences. Notice had been given that the company purposed withdrawing entirely from the city. Officers and counsel from Nashville met with the board and effected a satisfactory adjustment of the differences. The board receded from its demand for a pole rent. The company agreed to furnish five free telephones for the city's use, to establish an exchange at Mason and put it in communication with Covington and place both towns on the free list, besides maintaining their present free lists with towns and villages throughout the county.

The Memphis Telephone Company endeavored to effect a satisfactory contract with the city authorities after the Cumberland company closed its office, but failed. It is understood that the Memphis company will establish a long-distance toll line to Covington at an early date.

The rural telephone system is being extended rapidly in every direction and constructors say they cannot keep up with orders. The telephone is one of the greatest conveniences the progressive farmer can have, and the cost is remarkably cheap compared with the prices paid in the big cities. Farmers who have the telephone would not know how to get along without it, having realized its value as a convenience in time saving.

Use of Telephone Among Railroads

A. G FRANCIS

The telephone is one of the great institutions and conveniences of modern life. We use it, we cuss it, we complain, we grumble, but after all how could we get along without it? Business negotiations of great moment are carried on by this means of communication, and when this is done men realize and speak of its value.

There is a much more valuable side. In cases of petty business we can transact in a minute what, without it, would consume half an hour, or, again, we do in five minutes what would otherwise take an afternoon; in appointments, we accomplish with a few calls what it would take hours otherwise to do.

For convenience, let us discuss the question by dividing the subject into the following heads:

A. Economy.
   1. Direct exchange line.
   2. Private branch exchange.
   3. Short private line or pony line.

B. Development.
   1. The growth during the past five years in Chicago.
   2. The growth in the country at large.

A Direct Exchange Line.—When a man starts in business one of his first thoughts is to be able to reach the public and to have the public reach him easily and quickly. The installing of a telephone at a comparatively trivial expense accomplishes this and saves additional help and a great deal of time. A railway man communicates with his officials and employes as well as with the public. A careful study has shown that a large percentage of his business is with his own people.

The Private Branch Exchange.—When we find that a railway company has a number of direct lines for its telephone business it is time to consider a branch exchange system. The advantages of the branch exchange system to the railway corporations are many as regards the general telephone service. This service is made available at all times and many points, and time is saved to those who make use of it. This works both ways, because all incoming calls are first received at the switchboard, where they may be distributed directly to the person or department wanted, thus saving a great drag on the service caused by holding the lines while sending for the papers or person wanted. By proper calculation of the trunk lines between the private branch exchange switchboard and the central office required to carry the traffic the report of busy to incoming calls seldom, if ever, need be heard.

The private branch exchange also acts as an intercommunicating system between the various departments, puting the heads of departments readily into communication with any desired associate or employe.

The increased capacity and flexibility of the telephone service attained by the use of the branch exchange system in a railway office is found by those who have had sufficient experience to appreciate its working, to be worth far more than its cost. The cost of installing such a system is frequently governed by the mileage of the various station circuits. When a railway company has a general office and headquarters in the heart of a city, and its stations and terminals are several miles away from that building, it is frequently economy to put in two private branch exchanges and connect them by trunks.

These lines are placed principally along yards, connecting various places like the round house, freight yards, switchtender's shanties, etc. In an isolated village these may be of advantage, but when a railway company has a private branch exchange these should invariably be connected into the exchange. It gives them the advantage of communicating with any department that may be interested in the work at that point, thereby again saving time, which is the important factor in all railway service.

In the city of Chicago five years ago railway officers, general and freight, were almost wholly served by grounded lines. At that time there were scarcely a dozen private branch exchange systems in operation. The ticket offices and freight depots were for the most part equipped with single exchange lines, consequently traffic was so congested as to make complaints of inability to get into communication with these different departments a constant occurrence. The facilities of the few offices which had private branch exchange systems were utterly inadequate to handle their traffic.

There has been a steady and carefully economical growth, which will be seen by the following figures, which cover the situation up to January 1, 1904:

Railway switchboards, 47; trunk lines connecting these switchboards, with telephone central exchange, 322; stations connected with these switchboards, 1,403.

It is true that Chicago is one of the greatest railroad centers in the world. The railway companies should be properly equipped with telephone facilities for handling their business. Still, the largest private branch exchange in Chicago has only 117 telephone stations and nineteen trunks, while Philadelphia has one railway private branch exchange with 442 telephone stations and twenty-five trunks.

A short time ago a friend of mine was relating his trouble in being unable to reach a certain freight depot on account of the lack of telephone facilities. I asked him what he did in a case of this kind, and he said that where he found there was one or more roads which reached the point to which he wished to ship freight he gave it to the first railroad he could reach by telephone. This indicates that the telephone facilities in the freight depots are not adequate. That one item of freight would have paid for one or two additional telephones for an entire year.

Some of the railway companies have gone so far as to extend telephone lines from their private branch exchanges through the signal towers along the various divisions of their systems, placing a telephone in each tower, thereby, in case of accident, rendering quick communication from the train to the dispatcher, or, if necessary, the division superintendent can get on the line and talk with the conductor of the disabled train. The railroads are in a very advantageous position to build telephone lines for their purposes, inasmuch as they already own rights of way and pole lines already constructed. Students of railroad telephonic development maintain that we shall undoubtedly see in the near future a remarkable development of the use of the telephone by the various railway companies of the country.

Railways have passed the time when they can obtain business by cutting rates. They are dependent upon the service they can furnish. The times require modern improvements and up-to-date methods. Everything that builds up a better railway service helps to increase traffic, and increased traffic means longer and wealthier roads; more business, greater earnings.

[Paper read by A. G. Francis, Chicago, at the twenty-third annual convention of the Association of Railway Telegraph Superintendents, at Indianapolis, Indiana, June 15 and 16.]

RIGHT TO USE STREETS IN MONTANA.

THE Rocky Mountain Bell Telephone Company, which operates in Montana and adjoining states, was desirous of constructing a line through the city of Red Lodge. The company, therefore, served upon the mayor and city council of Red Lodge a demand that they designate the streets and alleys upon which the company should place its poles and other fixtures. The council treated this demand as an application for a permit to pass through the city, and thereupon refused it, for the reason that it was in violation of a city ordinance, which prohibited the erection or planting of poles or stringing of wires on or above the streets within the corporate limits, providing that the only way that telephone wires may be strung through the city is that they be constructed under the streets in conduits, which must be placed at least four feet from the surface. Penalties in the form of fines and imprisonment are provided for violating the provisions. On its being denied the right to erect poles in the streets the company made application for a writ of mandamus to compel the city to grant the request and designate the location of the proposed lines. The writ was denied in the lower court and the case was then carried to the Supreme court, where a decision was recently given.

Section 1000 of the civil code of Montana reads as follows: "A telegraph or telephone corporation or a person is authorized to construct such lines from point to point along and upon any of the *public roads* . . . but the same shall not incommode the public in the use of the said roads or highways." This section at the time of the suit had not received a construction and the first query of the Supreme court was whether city streets are included in "public roads." After carefully reviewing the decisions the court decided that it did include city streets. The company, therefore, relying on this statute, argued that the city ordinance which narrowed the general right to construct telephone lines by making it mandatory that they be placed under the streets, was void. The writ of mandamus compelling the city to designate upon what streets the lines of the company should be placed was, therefore, granted. This is the first case in Montana in which this direct question has been raised, and the decision is very favorable to telephone companies therein. Cities in this state may only make reasonable regulation and rules for the placing of poles and cannot arbitrarily decree that all lines must be placed in conduits.

State ex rel. Rocky Mountain Bell Telephone Company v. Mayor, etc., of City of Red Lodge et al., 76 Pac. 758. Decided May 9, 1904.

WIRES OVER RIVER CAUSED DAMAGE TO PASSING STEAMER.

On May 14, a judgment of $1,501 was obtained against the Bell Telephone Company at Harrisonville, Missouri, in a case brought against it for damages caused by its wires being so low across the Missouri river as to carry away the smokestack of the steamer Moline, for which a suit for damages was brought. The wires were high enough to be clear of passing vessels in ordinary conditions, but owing to the high water in this case they were not. The decision is of considerable importance to all companies having telephone wires over navigable streams in that it illustrates the rule of law that vessels having the right of way on such streams may recover damages occasioned by obstructions placed in their way.

DECISIVE VICTORY FOR INDEPENDENT TELEPHONE INTERESTS IN OHIO.

On May 27 Judge Nippert of the Probate court of Cincinnati rendered his decision in the matter of the application of the Queen City Telephone Company, which has been seeking a franchise in the city for some time past, and by it the company has secured very satisfactory results. The opposition has been continually from the Bell interests, which have all along contested the progress of this Independent company. The court decided that the company, which is an Ohio corporation, with Senator Max Silberg, president; George W. Beers, treasurer, Ft. Wayne; Harry B. Gates, Indianapolis, secretary, is a bona fide corporation and is entitled to occupy the streets of the city by authority of its state charter. The company had previously asked the court to designate on what streets it should locate, and by this decision it is to place its conduits within the territory bounded by Freeman avenue, Micken avenue and Liberty street, Broadway and Eggleston avenues, and Third and Front streets. In other parts of the city it may erect poles to carry its wires. A $100,000 bond is to be given before commencing work as security to the city of the faithful performance of the conditions.

In re application of Queen City Telephone Company for franchise in Cincinnati. Decided in Probate Court May 27, 1904.

FRANCHISE CAN ONLY BE DECLARED FORFEITED BY COURT OF COMPETENT JURISDICTION.

The Supreme court of Nebraska, in deciding the case brought to determine whether the Nebraska Telephone Company has a franchise in the city of Fremont, has declared in favor of the company as follows: "The city of Freemont is enjoined from cutting and destroying the property of the company. When a city ordinance prescribes that permission to occupy the streets by a public service corporation shall be obtained with the consent of the mayor and council, such consent is sufficiently proved by an entry showing that a motion granting it had been offered and adopted. Forfeitures of the franchises and easements of a public service corporation in the streets can be declared and enforced only by a court of competent jurisdiction. The city claiming a forfeiture cannot be a judge in its own case or destroy the property of such a corporation in the absence of judicial warrant for so doing."

City of Fremont v. Nebraska Telephone Company, Supreme Court of Nebraska. Decided May 18, 1904.

LOCATION OF POLES IN HIGHWAY.

Although on the opening of a road or the original construction of a telephone line in an existing highway, the

road commissioners have agreed upon such regulations as they may deem necessary, their power of regulation of the highways is not thereby exhausted. They may adopt new rules and regulations according to the changed conditions and exigencies that the public traffic requires. The test of the commissioners to make new rules is whether they have abused the discretion which the law gives them. In a Pennsylvania case the road commissioners of Harborcreek township adopted a subsequent rule to the ones first promulgated requiring all telegraph and telephones lines to be erected along the property line; the rule affected some of the lines of the American Telegraph & Telephone Company, and the case being carried to the Superior court, the rules of law as above given were there declared. The court construed the rule that the poles were to be placed on the property line to mean that all necessary parts of the poles should remain within the highway and should be placed up to the line between the adjacent lands.

American Telegraph & Telephone Co. v. Harborcreek Township, 23 Pa. Super. Ct. 437.

SALE OF FRANCHISE IN WISCONSIN.

Section 1775 and following of the revised statutes of Wisconsin for the year 1898 authorizes corporations to purchase and hold any right, privilege or franchise conferred on any person or persons whomsoever, where such privilege or franchise is in direct aid of the business for which the corporation acquiring the same is organized. Some time ago the Wolf River Telephone Company acquired by purchase and assignment and for some time owned, the rights under the franchise of the Badger Telephone Company, located in the same vicinity. The highest court in the state has said in deciding a case brought by the seller against the purchaser, that inasmuch as the Wolf River Telephone Company had converted at least a portion of the property to its own use, it was thereby estopped from claiming that the other company had no authority to make the sale.

Badger Telephone Co. v. Wolf River Telephone Co. (97 N. W. 907.)

IMPORTANT DECISION IN KANSAS REVERSED.

As the result of a decision of the Kansas Supreme court given May 7, the telephone companies of that state may now erect their poles on highways without compensating the property owners therefor. The case has now come to have more than ordinary interest, owing to it having been decided exactly the other way at a previous hearing by the same tribunal. Some months ago one Michael McCann sought an injunction against the Johnson County Telephone Company to restrain it from constructing a telephone line along the highway in front of his farm without having secured his consent or compensating him for the alleged damage which the presence of the poles would occasion. The case was heard in the local court and the injunction was there denied to the petitioner. The case was then appealed to the Supreme court, where a verdict was given reversing the decision of the court below and granting the injunction. The report will be found in the January, 1904, TELEPHONY. As there stated, the result was disastrous to telephone interests if carried into operation, as it clearly implied that the consent of every person along the highways on which companies proposed to erect lines would first have to be secured before they could legally proceed to erect the lines. A rehearing was granted and on the above date a decision having exactly the opposite result was given. The majority opinion says in part: "The construction and maintenance of a telephone line on a rural highway is not an additional servitude for which compensation must be made to the owner of the land over which the highway is laid."

Michael McCann v. Johnson County Telephone Company, in Supreme Court of Kansas. Reversed May 7, 1904.

BELL COMPANY FAILED TO SECURE A FRANCHISE IN VAN WERT, OHIO.

By the recent decision of Judge Sweet of the Probate court of the above city the Central Union Telephone Company is denied the right to come into the town and operate a telephone exchange. The company had previously made an effort to secure a franchise from the council, which request being refused, the company applied to the Probate court. On the ground that the company is a foreign corporation the right of entry was denied. This objection was advanced by the city which was opposed to the entry of the Central Union Company.

SHARES OF STOCK, NOT TANGIBLE PERSONAL PROPERTY, IS TAXABLE IN IOWA.

In the tax case brought by the county treasurer of Polk county, Iowa, against the Iowa Telephone Company, to which brief reference was made in the last issue of this publication, the full opinion of the Supreme court has appeared and in it is discussed the question of what personal property of a telephone company is properly subject to taxation. Section 1323 of the code of Iowa provides that it is the stock of corporations and not the tangible personal property that is legally subject thereto. As to this company and all other incorporated companies, obviously, the instruments distributed through the different parts of the state and other property of this description cannot be taxed by local taxing boards.

Layman v. Iowa Telephone Company, 99 N. W. 205.

"HELLO GIRLS" GIVEN SEVERE TEST.

Immediately following the origination of the fire at the Wichita stock yards and the calling out of the department, for the next one and one-half hours, it is estimated that telephone calls at the rate of 1,440 per minute were answered by the central girls in the exchange building of the Wichita Telephone Company, says the Wichita (Kan.) *Eagle.*

"Everybody wanted to know where the fire was, the extent of the conflagration and asked hundreds of other questions," said Superintendent McVay. "A fire alarm summoning the department to a minor blaze is sufficient to cause thousands of calls, but more were answered Thursday than at any time since the company has been in business here."

With the exception that he had to wait perhaps a short time before receiving an answer from central the man desirous of finding all about the fire over the telephone had no idea that anything out of the ordinary was going on at the telephone exchange. A thousand lights appeared on the board at one time, indicating that that number of receivers had been taken from different telephones and that that number of people were desirous of talking.

When the alarm of fire was sounded from the stock yards, fifteen girls, the usual number, were at work on the local telephone board. Within a few minutes it was found necessary to call out the entire relief force. In addition three girls were taken off the toll board and set to work answering local calls. The force of fifteen was steadily increased until twenty-seven operators were answering calls. The force was divided and the operators worked in pairs. One girl took down connections while the other answered calls. At the end of an hour two girls fainted from the over-exertion and a third had to be taken to her home in a conveyance. It was nearly six o'clock before any noticeable decrease in the number of calls was observed.

Between the hours of 4:30 and 6 o'clock six fuses were blown out. This was caused by the enormous current that passed over the wires, caused by the receivers of 1,000 telephones being taken down at one time.

Independents Win at Cincinnati

BY THE decision of Judge Nippert in the Probate court at Cincinnati, the Queen City Telephone Company recently won a notable victory and the Cincinnati and Suburban (Bell) Company was given a staggering blow. For a long time at least four Independent telephone companies have been endeavoring to secure the right to construct a plant in Cincinnati, but up to the present time the Bell, through the aid of the city authorities of Cincinnati, has succeeded in keeping them out. Judge Nippert's decision, however, changes all this. His decree defined the mode of use of the streets by the Queen City Telephone Company, and thereby authorized that corporation to begin the work of putting in a telephone system in Cincinnati, if it accepts the terms fixed by the court within twenty days from the entry of the decree.

Cincinnati is one of the few large cities which has no Independent system. The city has repeatedly refused the applications of Independent companies at the instance of the Bell company. Three other Independent companies, besides the Queen City, have filed petitions, but they also were refused.

The city argued that the courts had no power to grant the franchise asked by the Queen City company. The court disagreed with this view, the following being the substance of its decree:

1. That the plaintiff is a corporation incorporated and organized under the laws of the state of Ohio, and for the purpose of building, owning, maintaining and operating a system of telephone and telegraph lines and conducting a telephone and telegraph business in the city of Cincinnati and elsewhere, and is authorized to bring this proceeding, and that the defendant is a municipal corporation and a city under the laws of this state.

2. That on the 12th day of October, 1903, the plaintiff, by authority of its board of directors, applied to the defendant, through its council, for the purpose of coming to an agreement with said city as to the mode of use of the streets, alleys, public ways and other public property of and within said city for its lines; but said city, on January 25, 1904, refused to agree with the plaintiff upon the mode of use of such streets, alleys, public ways and other public property for the purposes of its telephone and telegraph lines and system, upon any terms, and that it is necessary for said plaintiff to use said streets, alleys and public ways.

3. That all steps had been taken and all the events had transpired and happened at the time of the filing of the petition herein, authorizing the plaintiff to apply to this court to fix the mode of use of such streets, alleys, public ways and other public property for the purposes aforesaid. Therefore the court, coming now to direct the mode of such use, directs that the plaintiff shall use the streets, alleys and public ways of and within the limits of said city of Cincinnati for its telephone lines and system in manner following, to wit:

a.—That in the district of said city bounded as follows: Along McMicken avenue from the intersection of McMicken avenue and Freeman avenue to the intersection of McMicken avenue and Main street, thence along Main street to the intersection of Main and Liberty streets, along Liberty street to the intersection of Broadway and Liberty street, along Broadway to the intersection of Broadway and Eggleston avenue, along Eggleston avenue to the intersection of Eggleston avenue and Third street, along Third and Front streets, along Front street to the intersection of Front street and Freeman avenue, along Freeman avenue to the place of beginning, to wit, the intersection of McMicken avenue and Freeman avenue, and in such other thickly settled portions of the city as said plaintiff may from time to time select, all its wires shall be placed in underground conduits or subways, and no poles shall be erected in such districts or other portions of the city where the wires are placed in conduits, except for distribution of wires or cables from conduits or subways to buildings, and all such poles shall be, as far as possible, located in alleys, but in the portion of such district north of Liberty street and east of Central avenue, pole lines may be erected in localities not solidly improved. In the balance of the territory within the city limits said plaintiff is authorized to erect in the streeets, alleys and public ways the necessary poles and string the necessary wires thereon for its telephone and telegraph lines, but reserving to the abutting property owners all their existing rights. The plaintiff in constructing its system is authorized to construct all conduits, pole lines, abutments, manholes, house and exchange connections in the respective districts above named necessary to make its system a complete working system of telephone communication.

b.—All poles which are to be used and erected by the plaintiff shall be smooth and painted, and shall be located and erected under the supervision of the board of public service of said city, and to its satisfaction; and the wires shall in no case approach nearer than twenty-five feet to the surface of any street, alley or public way or private driveway over or along which the line or lines, poles and conduits shall be so placed as to interfere as little as is practicable with other telephone and telegraphic lines and other structures lawfully occupying said streets, alleys or public ways, either overhead or under the surface.

c.—If at any time any of the poles or conduits erected by the plaintiff under the provisions of this decree shall interefere with the public use of any of the said streets or property of the city so that it would be proper and advisable to order a change therein, the city may require the plaintiff to change the location or construction of said pole or poles or conduits to some other practicable location or design, without expense to the city.

d.—From time to time said plaintiff shall, before entering upon the construction of the contemplated work, file with the board of public service plans showing the location and character of the work designed to be constructed, but if there is anything improper in the location or design shown by said plans, said board shall not be deprived of its power to change the same so as to adjust the location and character of the work to meet the conditions existing at the particular locality, and unless so changed within five days permits shall be issued for the construction thereof.

e.—Said plaintiff shall, upon written notice from the proper authorities of said city that any local improvement, sewer or water main is to be repaired or constructed in such a manner as will require the removal or altering of any pole or poles, conduit or conduits, remove and change the same without cost to the city, so as to permit the construction or repairing of said improvement where ordered.

f.—All work shall be done in a thoroughly workmanlike manner, and of the best materials, and the board of public service shall prescribe the manner of restoring the streets, alleys and public ways, and shall be permitted to appoint an inspector or inspectors, at plaintiff's expense, to supervise the work of restoration.

g.—Before any work is commenced the plaintiff shall give a bond of not less than $100,000, to be executed by a surety company and to be approved by the board of public service, conditioned that the plaintiff will restore all streets, alleys and public ways where excavated by it; and that at the points and along the line of excavation said plaintiff will, for a period of three years thereafter, keep the excavated parts in repair; and that the plaintiff will save the city harmless from any liability arising out of the construction or operation of the plaintiff's telephone system.

h.—One duct in the conduit and one cross arm on the plaintiff's poles shall be reserved for police and fire alarm service wires.

The plaintiff shall file in court its written acceptance of the terms prescribed within twenty days from the entry of this order and shall pay the costs of this proceeding.

Acting upon authority of a resolution adopted by the board of directors, the Queen City company filed in the Probate court of Cincinnati its acceptance of the decree handed down by Judge Nippert defining the manner and mode in which that company may occupy the streets and alleys. The decree is held in abeyance by the filing of the bond in appeal on the part of the city. The matter goes up both on appeal and on error, the bill of exceptions having already been filed.

The Queen City Telephone Company and the city and Cincinnati and Suburban Telephone Company, also of Cincinnati, locked horns in the Probate court before Judge Nippert on the application of the latter, through City Solicitor Hunt

and Attorneys John Warrington and Miller Outcalt, to modify the decree of Judge Nippert prescribing the manner in which the new company must use the streets for telephone purposes.

The city proposed vital changes in the decree, which were strenuously objected to by Attorney C. B. Matthews for the Queen City company. Eight changes were suggested, three of which were important. The first was that the new company must begin work in the streets within six months from the going into effect of the decree and that five miles of wires must be laid and strung within twelve months or the decree is inoperative.

In the second change the city asked that operation of the decree be suspended one year in order to carry the case to the Supreme court, and if more time is necessary it is to be allowed.

The third change called for the court to fix the maximum price of telephones for business purposes at $76 a year and for residence service at $36 a year, in accordance with an offer made by the Queen City Company to the city.

Still another change demanded was that at the end of ten years the mode of use of the streets shall be such as may be prescribed in accordance with the methods provided by law.

The changes submitted by the city and the Cincinnati and Suburban company were of such vital importance that Judge Nippert decided to take them under advisement before he decides what sort of a decree shall be allowed.

Should the changes be allowed the new company will not be able to begin work until the Supreme court has decided the case, thus postponing the entrance of the Independent telephone system at least one year.

The Cincinnati Telephone Company, which is also seeking a franchise to construct a telephone system in the streets, has filed a mandamus suit in the Circuit court to compel Judge Nippert to give it an early trial. Judge Nippert overruled a motion for an early trial on the ground that he wanted the Supreme court to pass on the Queen City case first.

Following the decree heretofore mentioned, in which Judge Nippert decided that the Queen City company was entitled to a franchise in Cincinnati, this same jurist rendered another decision granting a franchise to this corporation. The city and the Cincinnati & Suburban Telephone Company took an appeal to a higher court at once.

Judge Nippert's first decree prescribed how the streets should be used. The city, through Solicitor Hunt, sought to have this decree kept off the records of the court until Judge Nippert returns from Europe. Judge Nippert, however, has now decided that the Queen City company is entitled to have the decree placed on record at once, and it was done.

City Solicitor Hunt and Attorneys John W. Warrington and Miller Outcalt, for the Cincinnati and Suburban company, will contend in the Common Pleas, Circuit and Supreme courts that the law authorizing the Probate court to grant franchises is unconstitutional in that it delegates to the court a legislative function, a thing the legislature has no power to do. If this contention is sustained the franchise of the Queen City company would be invalid.

City Solicitor Hunt does not expect the Queen City company will begin to construct its system in the streets, although one or two streets may be opened. The chance for reversal by the higher courts, he thinks, will deter the new company from investing any money until its rights are fully settled.

GROWTH OF INDEPENDENTS.

Since 1896, when the first Independent telephone exchange was built, more than 2,000,000 telephones have been placed in use by Independent companies, whereas the telephone companies using the Bell and Berliner patents, which up to five years ago had a monopoly of the business, have installed only 1,600,000 telephones. The vast growth of the Independents has practically taken place since 1899.

UNDERGROUND CONSTRUCTION.

The Iowa Telephone Company will put in a conduit system at Keokuk, Iowa.

The Valley Telephone Company of Caro, Michigan, will install an underground system.

The Mexican Telephone Company will build an underground system in the City of Mexico.

The district government at Washington, D. C., will place its telephone and fire alarm wires underground.

The Cuyahoga Telephone Company of Cleveland has been ordered to place two miles of wire underground.

The Twin City Telephone Company has been ordered to put its wires underground in some parts of St. Paul.

Within another year it is planned to have all the wires in the business section of Seattle, Washington, underground.

The Lewiston-Auburn Telephone Company of Lewiston, Maine, will put its system underground in the business district.

New underground cables are being laid by the Interstate Telephone and Telegraph Company at Peoria, Illinois, at an outlay of over $300,000.

Permission has been granted the York State Telephone Company at Binghamton, New York, to construct a subway for 200 feet in Chenango street.

The city council of La Porte, Indiana, has granted the La Porte Telephone Company permission to lay an underground cable in certain portions of the city.

The South Bend (Indiana) Home Telephone Company is placing an addition to its switchboard, and is also installing 100,000 feet of aerial and underground cable.

The city council at Wilkesbarre, Pennsylvania, has introduced an ordinance requiring all telephone and telegraph wires to be placed underground in certain streets.

George M. King has received the contract for laying about 60,000 feet of conduit in West Des Moines for the Mutual Telephone Company of Des Moines, Iowa.

An ordinance has been prepared and will be introduced to the Board of Aldermen at Paducah, Kentucky, requiring all telephone wires in the city to be put underground.

The Philadelphia mayor and city councils will be requested to enforce an ordinance requiring all telephone and other wires to be placed underground on several streets.

The village board of Bath, New York, has granted the directors of several rural telephone lines entering the village permission to put their wires in an underground conduit through Liberty street.

Bismarck, North Dakota, is to have all telephone wires underground in the business portion. The system is now one of the best in the northwest, and the management is determined to have all modern improvements.

The Summerville Telephone Company of Summerville, Pennsylvania, is reconstructing its system at Punxsatawney, and will install a central energy system. Underground cable of 200-pair capacity will be used in the business district.

The People's Telephone and Telegraph Company of Knoxville, Tennessee, is arranging to put many of its lines underground. It has ordered four carloads of cable and underground conduit for this purpose, and work will commence at the earliest practicable moment.

The Citizens' Telephone Company of Columbus, Ohio, is rapidly pushing forward the underground construction of its system, and during the summer will install about 4,000 new telephones. The expense of this and other improvements will amount to nearly a quarter of a million dollars.

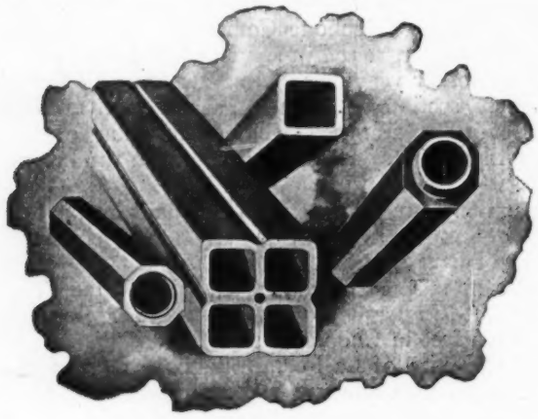
Concerning Telephone Lines

SAMUEL G. McMEEN.

DISTRIBUTION.

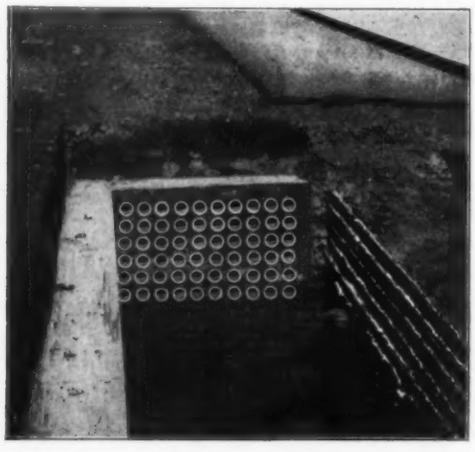
Telephone lines when in cables can be carried from the central office toward the subscribers' under the ground or over the ground, and are known as underground or aerial, as they are so placed for service. There is no fundamental difference between the one kind of cable and the other, excepting that the underground cable is sometimes given a thicker lead covering.

A single wire telephone line suffers so distinctly from



TWO FORMS OF SINGLE DUCT AND ONE FORM OF MULTIPLE DUCT, TERRA COTTA TILE.

disturbances caused by cross talk from adjacent telephone lines and from noises from currents induced by adjacent power lines, that it is plainly unsuitable for use at all, except in such fortunate circumstances as leave it free from these things. In earlier days, when feebler transmitters were used than now, when lighting and power circuits were practically unknown, and before electric traction reached its present stage, grounded lines were free from hurtful cross-



MANHOLE ENTRANCE OF A CONDUIT OF A FORM RELATIVELY NEW.

talk because of the small currents from the feeble transmitters, and from noises from the heavier current circuits. It was then possible to carry such telephone lines in cables for reasonable distances without serious cross-talk; but at a certain stage of telephone development it was violently contended that the lines never could be put underground exclusively. It was even intimated that it would never be possible to talk at all by means of underground cables.

Grounded long-distance lines of greater length than about twenty-five miles having been found to be commercially unsatisfactory with the transmitters then in use, metallic circuits of hard drawn copper resulted as a substitute. The length of these metallic circuit long-distance lines, together with the growing necessity of escaping from the cross-talk due to more powerful transmitters and the noises due to the increasing power circuits, developed the practice of making the subscribers' lines also into metallic circuits. With two wires per line, there was no longer a reason why the lines might not be grouped together in cables, nor why these cables might not be laid in the earth.

Speaking generally, there are four possible ways of distributing cables in the ground. All of them are practiced, and they are these: First, to carry them through and under the streets in some underground passageway already provided for another purpose. An example is that of the telephone line distribution in Paris, France, where the cables are carried through the municipal sewers, which are large

CONDUIT IN POSITION.

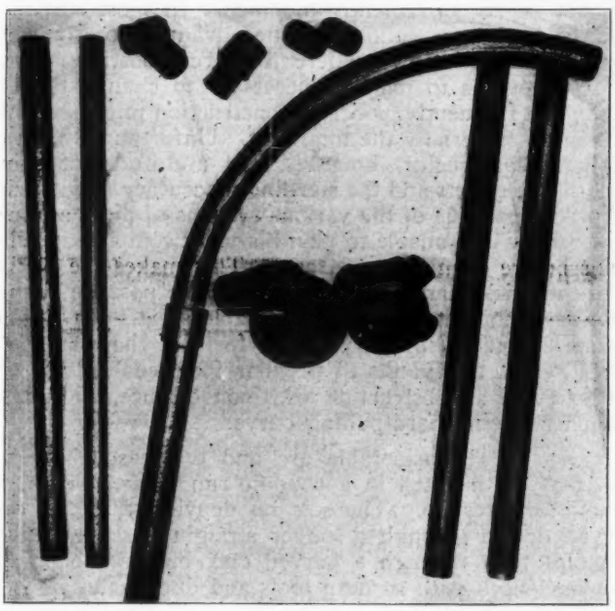
and roomy. In a sense the sewer method offers a definite advantage, in that it must reach all parts of the community, and in some way connect directly with each building. It has the further accidental advantage that it provides its own place for the cables, so that the cable-carrying project does not interfere with the sewer system, nor the sewer system obstruct the convenient laying of the cable system.

A second and similar method is the carrying of the cables in tunnels laid below the street surface and below the pipes usually found immediately below the pavement. An excellent example of such construction is found in Chicago. There the telephone cables for one of the operating companies are distributed through a system of tunnels constructed with the idea of such distribution first in view. The instance is unique in the particulars that the tunnels are of relatively small size, although they are used for freight traffic lines as well as for cable subways; that they are very deep, being about forty feet from the street surface, and that the cables from the present single central office drop to the level of the tunnels, distribute through them, and rise to the buildings they are to serve, without appearing above ground at all. At the time of this writing there are no evi-

dences visible above ground of the existence of such lines, except at the central office and at the stations of the subscribers. The tunnel system is further notable in the features that it takes in at this great depth practically all of the streets in the intense business center of Chicago; that in its construction practically a uniform kind of material had to be excavated, and that the traffic through the streets of the city was continued with absolutely no interference from the subway construction from its beginning to its end.

The third system of cable distribution is that of laying lead-covered cables, armored or unarmored, directly in a trench or furrow in the earth, and covering with the earth again, or perhaps first with a slight layer of concrete. Obviously this method is inexpensive, and equally obviously it is not convenient to remove and repair or replace a defective section of cable.

The fourth method, and by far the most extensively used, is that of laying in the streets at a relatively shallow depth a system of pipes into which cables are drawn when required. It may be said that such a method is the standard for underground construction. Broadly speaking, this



FEATURES OF FIBRE CONDUIT MATERIAL.

standard method of conduit construction and cable distribution consists of a number of manholes along the streets, of such size as to permit workmen to find room in them of such depth as is required by them, and such distance apart as is determined by the obstructions met in laying the ducts, and by the size and length of the sections of cable to be drawn into them; and, connecting these manholes with each other and the central office with those nearest it, the pipes or ducts, into which the cables are to be drawn.

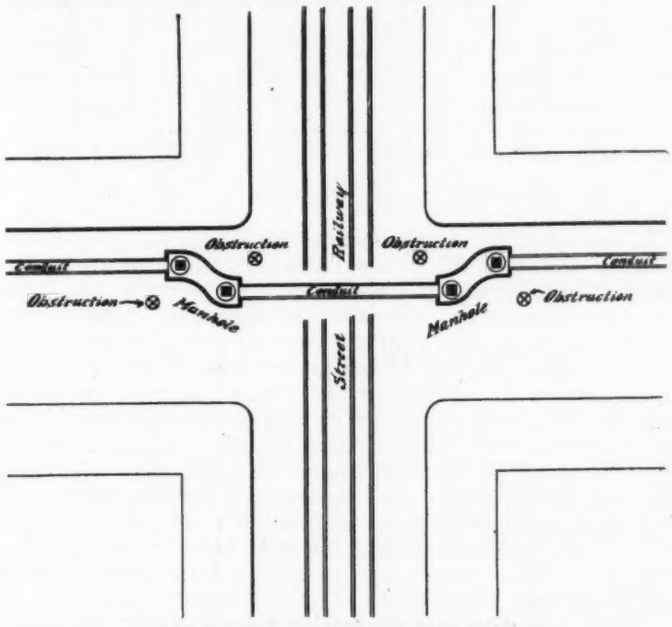
Many materials make claims to recognition as the best for ducts; burned clay or terra-cotta was one of the earliest, and is one of the most widely used to-day. In its earliest form several cables were drawn into one large duct, and this method very speedily proved that terra-cotta was a satisfactory material, and that using one duct for more than one cable was an unsatisfactory method. Single terra-cotta duct composes a large part of present underground systems. Much tile is now laid in which each piece has two or more ducts, but in all cases but one cable is drawn into a single opening.

Because of its considerable weight, terra-cotta pipe is made in relatively short lengths; because of its material and method of manufacture it is not possible to join the sections as tightly as can be done with pipes of other material. Because of its material terra-cotta pipe can be broken by the tools used in other kinds of work in and on the streets. A pick might be driven through such tile and into a cable within unless other protection were provided. For these reasons, as well as for reasons having to do with reductions of cost in shipment and in labor of laying, other sorts of duct have made claims which are recognized by a more or less extensive use. One is known as cement-lined pipe, and is composed of a rather light sheet metal pipe lined with

TWO EXAMPLES SHOWING CONDUIT IN PROCESS OF CONSTRUCTION.

a considerable thickness of hydraulic cement. The bore and the outside are round; the sections are about eight feet long. Length for length it is lighter than terra-cotta, and can be laid with considerable speed, on account both of its length and lightness.

Creosoted wood pipe, sometimes known as "pump-log," has something of the same advantage as cement-lined pipe, with the additional advantage that it can be fitted at the



CONSTRUCTION PAST OBSTRUCTIONS.

joints with a trifle greater security; it can also be joined somewhat better than terra-cotta pipe.

There is a class of ducts made of paper saturated with some asphaltic or bituminous compound, the result being a light, waterproof and readily joining material. It is claimed that fibrous materials saturated with these mineral compounds will withstand all the destructive influences they may meet, and it is certainly true that the history of their use has not disclosed reasons which may be used against

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them. The methods which can be used in joining sections of paper pipe are wholly satisfactory. Joints are made quickly, and, if desired, can be made water tight. In fact, such pipe is used extensively in irrigation work.

As in the case of terra-cotta pipe, those of cement-lined sheet metal, of creosoted wood, and of fiber and asphalt, are in danger from without. The remedy is the universal one of laying the lengths of pipe upon a concrete base, covering with a concrete top, and in most cases providing concrete sides. In a large installation this envelope may be four inches thick, top, bottom and sides; or, in small plants, it may be two inches thick, top and bottom, only the sides being unprotected by concrete.

Iron pipe jointed by means of screw threads has its place among duct materials. It is not good in that it is apt to be destroyed by rusting and electrolysis, but it has advantages in that it needs less protection against picks, and in that it can be bent on any required radius. This feature makes it of value in making curves such as may be needed to oppose obstructions in a line of conduit.

Cement ducts have been used and proposed to be used in a variety of forms, from that of single or multiple duct material in sections to be laid after the same manner as terra-cotta ducts, to that of making the ducts in a trench, thus combining the operations of duct manufacture and

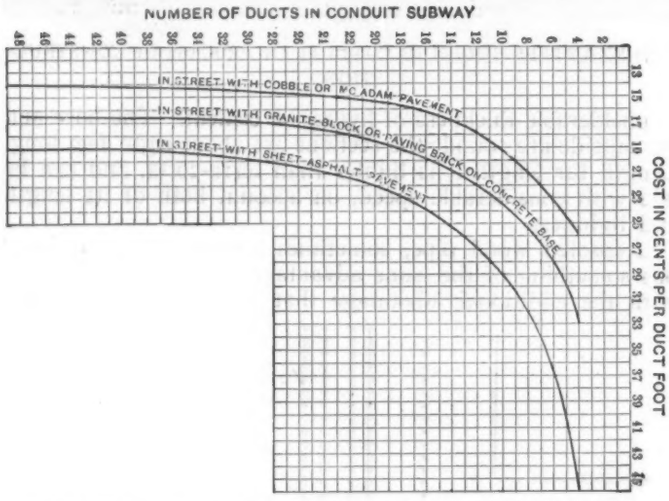
NUMBER OF DUCTS IN CONDUIT SUBWAY
IN STREET WITH COBBLE OR MC ADAM PAVEMENT
IN STREET WITH GRANITE-BLOCK OR PAVING BRICK ON CONCRETE BASE
IN STREET WITH SHEET ASPHALT PAVEMENT
COST IN CENTS PER DUCT FOOT

TABLE SHOWING COST OF UNDERGROUND CONSTRUCTION.

conduit building. Many changes have been rung upon this general theme in European cities and in Germany. The matter of concrete block conduit construction has been worked out with characteristic thoroughness. A large part of the telephone cables of the German postoffice are laid in such conduit. An interesting phase of constructing conduit from cement or concrete in the trench is that of maintaining the hole of the duct by leaving a wax mandrel in the mass until it has set, then melting it out by the use of steam. Another proposal by an American has been that of uniting the tensile strength of wire netting with the pressure resisting strength of concrete by imbedding sheets of wire mesh in the concrete, maintaining the duct hole by the use of a mandrel. There are no extensive American applications of either of these forms.

There is accessible in the market a form of material designated as stone conduit. It is of the concrete class, and it is probable that some would claim that when properly laid the material of the conduit and that of the concrete envelope of a mass offer greater resistance than if the duct material were terra-cotta, or something else less willing to unite with the added concrete covering.

The foregoing comment upon duct materials will be seen to contain no definite recommendation as to what material one shall choose, and it is so because no such statement can be made with justice and with authority. In a given state of circumstances the application of good sense will enable a decision to be reached.

As telephone cables are heavy, as they must be shipped from the factory to the place of final use on reels of such size and weight as can be handled without unreasonable difficulty, the lengths that can be shipped and drawn into the conduit are subject to limitation. From 200 to 500 feet of the largest size cable can be drawn in with relative ease. Manholes are necessary, therefore, to enable all the sections of a long cable to be finally joined up into one piece; they are necessary also to permit the cables to turn corners and to be divided and branched to enter buildings, or to run to other distributing points.

Speaking broadly, a manhole is but a pit in the earth, lined with something which will keep out moisture reasonably well and prevent the earth from caving in, and provided with a cover which will leave the street surface usable. A large portion of existing manholes are lined with brick. Practically all of the remaining portion is of concrete. A brick manhole is handier to build, because it can be made of such a shape as may be decided upon at the last moment, whereas a concrete manhole, being built around a mold, may not be so conveniently modified. In most situations, also. the concrete manhole has the advantage of somewhat lower cost. In a town where the street obstructions are not so severe as to make it necessary to change the type of manhole frequently, concrete construction might be found to diminish materially the total cost. Unfortunately for the telephone constructor, however, the multitude of things found in the streets and the startling inaccuracy of municipal and private records of the various systems of pipes and conduits, render him unable to plan his work complete in all its details before opening the streets. This makes the flexibility of the brick manhole, with reference to possible changes at the last moment, a very considerable asset. An instance of such assistance, by varying the form of the manhole, is shown, where two vaults of peculiar form enabled the conduit to avoid an obstruction with convenience, without introducing a long, hard-pulling curve.

Curves of a considerable arc and on reasonably short radii may be inserted in a conduit run between manholes without evil results. There is no denying that the cable may be drawn through a longer straight passage between manholes than through a curved one, but as the possible drawing length with modern tools and duct materials is ordinarily greater than the conditions of distribution require, curves often may be introduced with great advantage. Instances of such advantage are the curving of the conduit to avoid large obstructions, changing its form for the same purpose, as, for instance, might be done in a conduit which reached the vicinity of the obstruction rectangularly, six ducts high and four ducts wide, and there changed from vitrified material to iron pipe, swinging into a vertical layer twenty-four ducts high; afterward to return to a rectangular form, either the first or some other.

Manhole covers, made of cast iron, may be round or rectangular. The round cover has the advantage that it cannot be turned in any position so that it will drop through the opening into the manhole, injuring the cables. The square or other rectangular cover, if not actually hinged to its ring, may fall into the manhole and do great damage. Of whatever shape, the covers may all be ventilated by having holes in them, or may be solid and supplemented by other inner covers, with gaskets, etc., for sealing the opening tightly. Either plan aims to reach a definite end—the ventilated plan to take care of gases which seep into the conduit system, by letting them out freely; the closed plan by making the whole conduit system a compartment in which air may be kept under slight pressure, thus preventing the seeping in of gases. The ventilating plan is simpler, and in most circumstances is satisfactory. Under most conditions

manholes may be kept sufficiently dry by making a sewer connection at the bottom.

A number of methods are possible for getting the lines from the underground cables to the subscribers' premises. In the intense business center of a city, a cable may be carried directly from a manhole through the special duct into the basement of a large building, up a shaft of some sort in that building, with branches to suitable terminals at the proper floors, using up a whole cable or a number of cables in each building. In sections of the business center requiring few pairs, a cable may be terminated on the side of a building, say in the rear, and the lines carried from building to building by means of rubber insulated twisted pairs. If carefully done, it is even possible to distribute in this manner along the fronts of low buildings, concealing the group of wires sufficiently by making the run tight and supporting it in a workmanlike way. An alternative method is to enter one basement of a group of buildings, distributing there in a terminal a part of the capacity of the cable, carrying the balance through to another or several other basements, supplying each building by carrying the necessary pairs up into it.

When neither method applies, it is customary to terminate the underground cable by carrying it to the top of a distributing pole having cross arms or a distributing ring, and a terminal of one sort or another. From the insulators of this pole top pairs of wires drop to the subscribers' premises. Undoubtedly the neatest and most sightly method is to use twisted pairs of rubber covered wire for these drops.

Housetop fixtures to which underground cables may be carried and distributed directly, or by the assistance of other fixtures, to the premises, are extensively used outside of the United States. The fatal objection to general adoption of such a method is that there is generally no one source of authority for such use of housetops. An explanation of some extremely low telephone rates in certain foreign cities has been found in that the government furnishes practical condemnation of housetop wire privileges, and builds exchanges of considerable size without a conduit system and with simple, almost primitive, methods of distribution.

When it is considered that all of the simple, practical methods of getting wires from the underground cables to the subscribers' stations are based upon the use of basements, or of alleys, or of back lots, or of the outsides of the buildings, one will appreciate the difficulties met in cities of certain kinds. An example is the City of Mexico, in which the houses have no cellars, and no basements; where there are no alleys and no back yards, and where housetop privileges are not under the control of any one authority; the streets through such portions of the city may not have poles in them. Considering, therefore, that one may not terminate a cable beside, beneath, behind nor upon a building, it is evident that the problem contains certain perplexities. As the house is built around the yard instead of the yard around the house, escape in that direction is not offered. Fortunately, it is not likely that cities of this character will ever be built in the United States.

Estimates of the cost of an underground system may be reached in various simple ways. Perhaps as direct as any is to subdivide the whole work into its principal heads, such as character and amount of pavement to be torn up and relaid; volume of trench excavation and kind of material to be excavated; total amount of duct to be laid, divided into classes as to size, so many thousand feet of trench containing ten ducts or fewer; so many containing eleven to fifteen, etc.; so many manholes of each of the various representative sizes, and so much actual material and labor. By far the most valuable aid in arriving at such costs is a mass of data compiled from previous experience, for no work should ever be counted done until the estimate has been checked against the actual cost and the reasons for all discrepancies determined and explained.

C. J. Field has performed a valuable service for all persons interested and concerned in underground conduit construction, by compiling a considerable amount of data, and expressing it in the form of curves. A reproduction herewith of his table shows the cost, under stated conditions, of a system of conduits of the terra-cotta type. It will be found to comply with reasonable exactness to conduit of other materials than terra-cotta, of which the price per foot is similar, and the general form and labor of laying not much different. The price per duct foot upon which the curves are drawn is five cents.

For purposes of estimate, or for checking against the result of estimates made in other ways, one has only to do the following things: Classify from the conduit layout the lengths of the various runs under each kind of pavement. Read from the curve the cost in cents per duct foot of each different size of conduit for its kind of pavement; multiply each item by the determined factor furnished by the curve and cast up the total.

Mr. Field suggests with reference to these curves that from twenty to twenty-five per cent may be added to include manholes and incidentals. This, it is evident, is valuable for preliminary estimating purposes, but, of course, must not be expected to furnish results with the same accuracy as the curve would give for conduits.

Note.—This is the third of a series of articles by Mr. McMeen on telephone lines. The succeeding articles will treat of electrolysis of underground cables, the testing, location and removal of faults, and other important matters.

EDUCATION BY TELEPHONE.

Frank Charles, of Waterville, Ohio, is completing his high school course under as difficult circumstances as perhaps have fallen to the lot of any student. He is to be the only male graduate of the Waterville high school. A short time ago, while crossing the river on a cable, he was thrown to the bottom and severely injured his foot and leg. Since that time he has been confined to his home in Wood county and the injured limb has been in a plaster cast.

There is, however, a rural telephone in his father's house and the young man has prevailed on Prof. Whitmer to allow him to complete his course of study by telephone. Each evening after school Charles is carried to the telephone and comfortably arranged on a couch and over the telephone he recites his lessons to Prof. Whitmer, in Waterville, after which the following day's lessons are assigned. His progress so far has been so satisfactory that unless something unforeseen arises the young man will be able, with the help of crutches, to take his place among the graduates and will hold the unique record of having taken a considerable portion of his instruction by telephone.

KINLOCH COMPANY TO BUILD.

The Kinloch Telephone Company of St. Louis, Mo., has bought the site at the northwest corner of Tenth and Locust streets, for $200,000, and will at once proceed to erect there a twelve to fifteen story building, at a cost of $850,000. The deal was directed, it is understood, by the Mississippi Valley Trust Company as financial agents for the Kinloch company.

Financial arrangements are being made by the Kinloch company with a St. Louis banking syndicate by which, with other Independent companies of the country, it will be enabled to perfect a transcontinental long distance telephone system.

It is with this project in view that new quarters are sought. The Kinloch company will retain the four top floors of the new building for its own office exchange. Within ten months the Kinloch company expects to have its new home completed and will then move from its present quarters.

QUESTIONS AND ANSWERS

Conducted by J. C. Kelsey, Purdue University, Lafayette, Indiana.

Can we get rid of cross talk and induction in our system by putting in a common return? We have a magneto grounded system of 190 telephones. The cable runs from switchboard to distributing board, and through the usual fuse and carbon arrester, thence to the poles outside. One cable is forty feet and the other 108 feet in length. Instead of being put up metallic through the cable, it is single conductor, and grounded at switchboard. The induction comes from the light plant, which has a sixty kilowatt alternator, two phase current, no arc lights, and large transformers. By making the ground connection at the poles, or from the terminal heads, and putting in common return, would it stop our disturbances? Would it be better to ground the return and the office terminal at same place?—C. Tel. Co., Texas.

The first thing that I would suggest toward a remedy, would be to run metallic from the switchboard to the cable poles, and get rid of the most plausible cause of your cross talk. Then put in a common return—not one of those that are common to most systems, but a proper common return—of copper wire, and all connections well soldered. The same sized return need not be used all over the town, as you could use iron on some small leads. On larger groups, No. 14 copper could be used, and on the largest groups, a No. 12 copper. If you have lines too long to be put on the common return, then you will have to ground the common return at the cable pole. But from the induction standpoint, it is possible that the absence of the ground will be a benefit. Of course, that is for you to try. These remedies are about all that can be given in connection with your problem. I know of many large cities with common returns that are comparatively free from induction noises, where single, double, and triple phase currents exist. By remedying your cross talk, I am pretty certain that the inductive troubles will be reduced at the same time. I do not claim that the noise will disappear, but it should not be objectionable. Two phase induction is no worse than the ordinary single phase alternating current. If anything, it should not be so severe as the single. Besides, the system apparently runs pairs of wires everywhere, so that there is a certain neutralization of effects between the light wires, which the telephone misses. The troublesome induction comes from single wires, such as the trolley, and the series alternating arc light wires. Apparently, you do not as yet have this to contend with. If you object to the expense of making the switchboard end metallic, try the common return system first, with and without ground, with a good ground at the office. No use of separate grounds. With this, you might help the induction, but it is very doubtful that your cross talk trouble would be reduced at all. Single wire cables are just what cross talk thrives upon.

Will grounding a cable sheath protect it from a 2,200 volt electric light current, or a discharge of lightning? In the latter case, the cable contains all metallic circuits, which makes me doubtful of grounding the sheath. What is the safest way to protect a cable hanging on electric light poles?—A. S., Minneapolis.

By grounding the cable sheath, the tendency of the cable to get an electric potential different from the earth is avoided. If at earth potential, no charges can exist on its surface, until there is a breakdown of the air dilectric, and a bad flash of lightning, or flame existant. The high tension power leads are protected from lightning by wires running on the pole line in their near vicinity, not too close to cause a breakdown of the dilectric, grounded every few poles, which tends to keep the power wires at earth potential. Being at earth potential, no induced lightning charges can exist on the wires in respect to the earth. If your cable is only grounded at one place, it might be possible for one of these induced lightning charges to exist at a dangerous potential. But when the real lightning strikes the cable, at a point where the best of grounds existed, the chances are that everything near would be destroyed. But such instances are very rare, and all that lines have to deal with are the induced charges, which, of course, can be destructive. Grounding a cable containing metallic lines will only reduce their potential with respect to the earth, and will not affect them otherwise. This point should not be any objection, rather an advantage. To protect cables on electric light poles, the most plausible method would be to get on poles entirely devoted to your purpose. It seems to me that little danger can exist from this possibility, as the wires are strong and rarely break. Beside, a 2,200 volt system should have no grounds. But they do, of course, and one of their wires laying against your cable will likely burn a hole in it, if allowed to swing to and from the contact. The best thing would be a protective net, which most telephone companies are now using, when crossing over the trolley and under the high tension wires of the interurban railway companies.

What is really meant by a semi-automatic telephone exchange, and how is it operated or handled? What advantages attend its use?—F. M.

As I understand it, and explained on page 83, May TELEPHONY, and Mr. Fallers' reply to Mr. Dommerque's article, in April TELEPHONY, the semi-automatic system is one in which the multiple is dispensed with, which is certainly a large first cost item, and to reduce the operating force just one-half. From the picture in May TELEPHONY, the board or group contains 200 line jacks, and 200 trunk jacks. At each subscriber's telephone is a device, which the subscriber sets and then puts into motion. A lamp is lighted at the exchange, which causes the operator to plug into the line jack, just as in the regular multiple common battery board. She throws a key, just as the manual operator does, which reveals to her, by means of a flashing lamp, the group of the desired number. Knowing the group, the operator simply plugs into that group of trunk jacks, and turns her attention to other matters. The act of inserting the plug lights a lamp at the plug end of the trunk, which reveals to that group operator that a call is coming to her board. Whereupon, she throws a key, which causes a light to indicate the number of the party desired, which causes the trunk operator to insert the particular trunk plug into the jack of the lamp corresponding. Both supervisory signals are lighted, and the trunk operator throws the listening key, which calls both subscribers to the telephone simultaneously. When both answer, the lamps go out, as in the common battery system. When the parties hang up, the lamps light, and the trunk operator pulls down the plug. This gives a disconnect signal to the originating operator, and she pulls down

her connections. The operator has no telephone, going by sight alone. She can handle 200 lines easily, and does not have the high multiple to look for the desired jack. There is no doubt of the sense and desirability of this system. It is built on safe principles, is fully common battery, will permit of party line selective ringing, and has all the flexibility of the manual system. I do not vouch for the exactness of my description of the operation, and will not, until I visit the exhibit in the Electricity building at the World's Fair. I might add that the system of plugs and jacks and cords assures one of good contacts, and that the liability of mistake is reduced to a minimum by the use of lamps in guiding the operator. I believe that the superiority of one system over the other will only be settled by the public. The engineers will hardly be consulted. If the people of Dayton, Ohio; Grand Rapids, Michigan; Lincoln, Nebraska, and other cities approve of the automatic system, all classes of business concerned, no better opinion could be rendered.

In your April issue you stated that no simple apparatus had been devised for the sending of wireless telephone messages, except the paralleling of wires on opposite shores of a river, for instance. I want to give you the results of experiments along these lines, covering a space of nearly four years. We have a wireless telegraph station, sending messages ten miles without trouble; and having trouble with the coherers, invented one that is entirely mechanical in construction and operation, needing no decohering. I found that this coherer was affected by a telephone circuit, and in the end succeeded in telephoning 2,500 feet, using a device consisting of transmitter carbon, ordinary receivers, 500 feet of fine wire wound around a bundle of iron wire eighteen inches long, mechanical coherer, and battery supplied from a storage battery at sixteen volts pressure. This outfit is thoroughly reliable, the voice being distinct, although unrecognizable. I credit the success of the apparatus to cross talking, the coherer being so very sensitive that it catches and multiplies the vibrations for a greater distance than a telephone circuit could do. What is your opinion of the commercial success of the above?—F. L. O.

This method seems to be considerably like the experiment of putting two repeating coils in the same neighborhood, without protection against cross talk. These coherers seem to be like the repeating coils; they take up the magnetic whirls and convert them into currents, which the receiver interprets. It seems to me that the limit is nearly reached, because of the inability of the small coherer to take up enough of the magnetic whirls to produce any sound. It is much like wireless telegraphy instruments, which if left locally, without ground connection, or capacity, or intercepting nets of great height and size, the limitations would be great. If such a device as nets, or earth conduction, could be used in connection with these coherers, the range might be increased. But the greatest limitation seems to be that you depend upon electromagnetic action, and not electrostatic. I am not well enough posted in the experimenting of wireless telephony to tell you just what has been done along the lines you mention.

What is a phantom circuit?—J. G., Florida.

This expression denotes the use of a circuit for two distinct purposes, such as the simultaneous use of telephone and telegraph, or two talking circuits. If the telegraph is added to the circuit after it has been used for telephone purposes exclusively, the telegraph circuit may be said to be the phantom circuit. It exists, without existing, materially. The word phantom seems to fit the cast to best advantage.

Is there any difference between the two common battery transmitter, or operator's circuit, shown in Fig. 1? The same transmitter, condenser, retardation coil, and induction coil can be used interchangeably, and I can find no difference. Yet I understand that there is a great difference.—W. M.

The figures indicate the practice of using a common battery transmitter, which, in order to prevent an excessive flow of current, insert a resistance something like 140 ohms. But to prevent cross talk between the operator's sets, the resistance has to enclose a core of iron, in order to prevent any undue fluctuation being felt in one circuit, due to something in another circuit. But the insertion of this impedance renders the transmitter powerless to produce intelligible tones, because the impedance is directly in the path of the transmitter fluctuations, and refuses to pass them through its windings. Therefore, the necessity of the condenser, which offsets the action of the impedance.

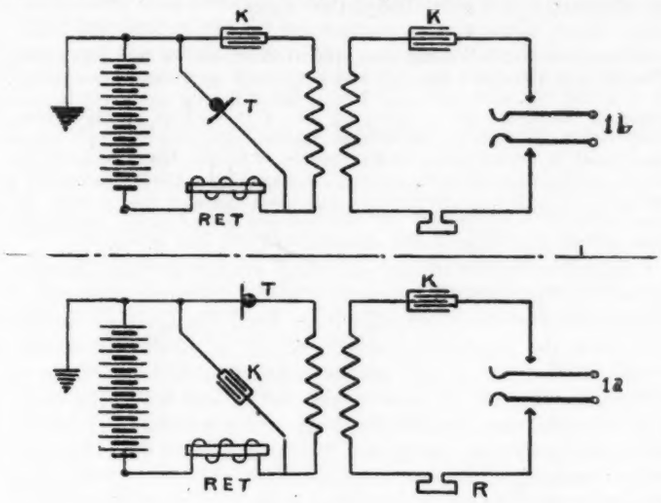

FIG. 1.

In *1a* we have the operator's set used by the Bell licensees. The transmitter, the primary winding, and the impedance are in series, with the condenser separating, as it were, the transmitter and primary winding on one side, and the battery and impedance on the other side. It would seem that when a person speaks into the transmitter, a pulsating, or undulating current is produced in the circuit, which is felt in the secondary circuit as a purely alternating current.

In figure *1b* the condenser, primary winding, and retardation are in series, with the transmitter apparently separating the circuit into two parts. Speaking into the transmitter, sets up an alternating current in the primary. This is the only difference possible, as a test reveals that there is no difference in the efficiency. If it is true that an alternating current is produced in the primary winding of *1a*, and no superiority shown, it would go to show that the early experimenters, who worked along the line of devising a transmitter, generating an alternating current, were working on a wrong idea. The real difference between the two methods is that *1a* has a retardation coil of 140 ohms resistance, and *1b* has 200 ohms. It would naturally have to be more in the absence of the primary winding from the circuit.

I am having some trouble with my service where I connect a metallic circuit between B——, V——, and T—— to a grounded line on the same poles out of T——, a distance of sixteen miles. Subscribers on this line find it quite difficult to hear when connected to the metallic line. We have no trouble with the service when the grounded circuit is connected to any other circuit, except the one it runs parallel with on the same poles. Do you suppose the reverse of the current over the same territory would have a tendency to reduce the voice current? If so, please suggest a remedy.—C. W. M.

If such were true, that lines running parallel were affected in like manner, to reduce voice currents, there would be quite a problem at hand to avoid bringing in numbers of circuits on the same pole line. And it looks reasonable to assume that wires running in, and then out on the same poles, would neutralize, and it might be true in a certain way, if the lines were grounded entirely. But there is no way that a metallic line and a grounded line can be affected, if the connection is made properly. The inductive neutralization between the parallel wires would be so small as to be imperceptible, as the wires are eighteen inches or more apart. It would be true that a third circuit would find no

inductive disturbance, because these two wires in connection will neutralize the external inductive effect on other circuits. It will act something like a metallic circuit. But the case in hand deals with a metallic and grounded wire. If properly connected, by means of a suitable repeating coil, there can be no neutralizing effect of any kind. I would suggest that the remedy process begin at the connection in the exchange, between these two lines.

We submit the following case, reported by one of our customers. They have a grounded line by which thirteen parties are connected. On this line No. 5 cannot ring No. 4, but can ring every other telephone on the line. No. 4 can ring No. 5 as well as all the others. Every other instrument, including central, can ring No. 4. From this it will be seen that in order for No. 5 to get No. 4 it is necessary to call some other telephone, or central, so as to have No. 4 signaled. The No. 4 instrument has been changed twice with the same results. The ringers on the line are all of same resistance. What would you suggest as a remedy?—W. T. and S. Co.

I cannot conceive of any electrical reason for this, assuming all instruments to be exactly alike. At first thought, I would say that No. 5 should have been changed as well as No. 4, on the ground of being equally at fault. However, in the little time given, no experiment could be made to determine what the trouble could be. I will leave the question open to the readers until the next number. I would like to be sure that No. 4 and No. 5 had been interchanged, before making extensive experiments. If No. 5, working efficiently at its location, could be placed at No. 4, and No. 4 placed at No. 5's place, and the same trouble noted, there is surely some interesting trouble. Changing No. 4, as stated, might have simply been a coincidence of local trouble in the instrument, which is hardly probable either, as all other stations except No. 5 operate it nicely. I therefore ask the reader for suggestions.

I am a college graduate and desirous of making the best start in the telephone business. Have had no technical education at all. What branch would you advise?—J. M. N., Cal.

The sales end of the business seems to draw the best pay. If you have the sales idea a technical education would not be required. The engineer designs and makes the apparatus, but the apparatus must be sold to pay expenses and keep things going. For a better insight into the question, I will refer you to a comparatively new branch of industry, which makes it a business of collecting data upon such matters, placing young men in desirable positions, and doing what I consider a great work, which will some day be considered a very useful adjunct in the starting out of young men in branches of employment. This concern is known as Hapgood's, Chicago, and has men in its employ who have investigated every phase of the business and will be glad to furnish you with the information you desire.

TELEPHONE STATISTICS OF THE UNITED STATES.

W. M. Steuart, chief statistician of the Department of Manufactures in the Bureau of the Census at Washington, has just issued a preliminary report on the telephone systems of the United States for the year ending December 31, 1902. This report includes all commercial telephone systems, all mutual systems, and all Independent farmer or rural lines that were in operation during any portion of the year, but does not include single lines of an exclusively private character. Unfortunately this information only comes down to January 1, 1903, but it is official and valuable for that reason. This is the first inquiry of the sort relating to the telephone ever undertaken in this country, and the gathering of statistics was found to be extremely difficult for various reasons, the principal one of which was the phenomenal growth of the Independent movement and the difficulty which Mr. Steuart's assistants found in keeping track of the hundreds of new Independent companies being organized in all parts of the country. While the showing made by the Independents in the accompanying report is a splendid one, it would have been nothing short of marvelous had the telephone census been taken in 1904 instead of 1902, and, it is believed, would have completely overshadowed any showing that could have been made by the Bell companies. Following is the report in full:

CONSTRUCTION, EQUIPMENT, ETC.

	Total.	Commercial.	Mutual.
Number of systems	4,151	3,157	994
Miles of single wire	4,850,486	4,779,571	70,915
Telephones of all kinds	2,315,297	2,225,981	89,316
Number of subscribers	2,137,256	2,048,736	88,520
No. of automatic pay stations	73,887	73,869	18
No. of all other pay stations	48,393	48,009	384
Farmer or rural lines owned by commercial systems:			
Number of lines	15,598	15,598	
Miles of single wire	138,426	138,426	
Number of telephones	121,905	121,905	
Number of party lines	258,166	*248,908	†9,258
No. telephones on party lines	886,152	808,571	77,581
Number of public exchanges	10,361	9,419	942
No. private branch exchanges	7,883	7,883	
Manual switchboards, total No.	10,842	9,901	941
Common battery system	837	830	7
Magneto system	10,005	9,071	934
Automatic switchboards	54	53	1
Messages or talks during year, total number	5,070,555,345	4,971,413,070	99,142,275
Local exchange	4,949,850,491	4,851,416,539	98,433,952
Long distance and toll	120,704,854	119,996,531	708,323
EMPLOYES AND WAGES.			
Salaried officials and clerks:			
Total number	14,124	13,958	166
Total salaries	$ 9,885,886	$ 9,871,596	$ 14,290
Wage-earners:			
Total average number	64,628	63,630	998
Total wages	$26,369,735	$26,206,065	$163,670
REVENUE AND EXPENSES.			
Total revenue	$86,825,536	$86,522,211	‡$303,325
Total expenses (including taxes and fixed charges except interest on bonds)	61,152,823	60,871,002	281,821
Dividends paid	14,982,719	14,981,649	1,070
Interest on bonds	3,511,948	3,511,768	180
Net surplus	7,178,046	7,157,792	20,254

*Urban party lines. †Rural party lines. ‡Includes assessments.

CONDENSED BALANCE SHEET.

	Total.	Commercial.	Mutual.
Total assets	$452,172,546	$449,485,693	$2,686,853
Construction and equipment including real estate and telephones	389,278,232	386,662,619	2,615,613
Stocks and bonds of other companies	9,938,342	9,938,342	
Machinery, tools, and supplies	9,689,691	9,657,956	31,735
Bills and accounts receivable	30,629,677	30,610,294	19,383
Cash and deposits	12,291,840	12,271,718	20,122
Sundries	344,764	344,764	
Total liabilities	452,172,546	449,485,693	2,686,853
Capital stock	274,049,697	273,388,432	661,265
Bonds	73,981,361	73,978,361	3,000
Cash invested (unincorporated systems)	6,161,299	4,571,318	1,589,981
Bills and accounts payable	44,491,066	44,411,639	79,427
Sundries	1,124,265	834,561	289,704
Net surplus and reserves	52,364,858	52,301,382	63,476

In addition to the reports obtained from commercial and mutual telephone systems, shown in the above table, the bureau secured reports of 4,985 Independent farmer or rural lines having 49,965 miles of single wire and 55,747 telephones. These figures added to the totals for the commercial and mutual systems give a grand total for the continental United States of 9,136 systems and lines, 4,900,451 miles of single wire and 2,371,044 telephones.

A number of commercial systems operate in rural districts, but, combining the totals for farmer or rural lines owned by commercial systems, mutual systems and Independent farmer or rural lines, gives a total of 21,577 systems and lines, 259,306 miles of single wire and 266,968 telephones, operated exclusively in rural districts.

THE TELEPHONE IN THE COURTS.

Philip Bardon has brought suit against the Northwestern Telephone Company at St. Paul in the sum of $2,000. He claims to have sustained injuries by the wires having been crossed when he attempted to use the telephone.

The United States Circuit Court of Appeals has denied the petition for a rehearing in the case of the Western Telephone Manufacturing Company vs. the American Electric Telephone Company, for infringement of the self-restoring drop patent.

Peter Peterson of St. Louis has filed suit against the Bell company in Missouri for $15,000 personal damages, alleging that while in its employ at Ironton, Mo., he lost the sight of an eye in an explosion of dynamite caused by the carelessness of a foreman.

According to a decision of the Kentucky Court of Appeals in the case of the Campbellsville Telephone Company against the Cumberland Telephone Company the latter must transmit messages received from the Independent company. This decision is important, in that the laws of that state, if the decision is correct, would force the companies to interchange business.

The jury in the case of Charles Fitterer vs. the Iowa Telephone Company found for the plaintiff in the sum of $3,000. Fitterer sued for $10,000. He was employed by the Iowa Telephone Company in a gang distributing poles. While assisting in loading a pole about sixty-five feet in length from a wagon, the pole slipped and crushed his wrist, inflicting alleged permanent injuries.

Because the Missouri and Kansas Telephone Company did not furnish him rubber gloves, William Gillim has filed suit in the Circuit court of St. Louis against the company for $10,000 for personal injuries. Gillim alleged that on March 7 he was working on a pole thirty feet from the ground on a wet day, and owing to the absence of rubber gloves he fell, sustaining a broken leg.

Judgment for 15 cents was awarded Constable Timothy J. Crowe of Chicago in Justice Hurley's court in a suit against the Chicago Telephone Company. Crowe alleged that on three occasions he dropped nickels in telephone slots, but received no service in return. He began a suit against the company. The case was continued several times, but on the final hearing he was awarded judgment.

In thirty-nine pages of complaint Ashjian Brothers, makers of rugs at Indianapolis, have set out that the Indianapolis Telephone Company failed to place their name and number in the latest issue of its directory, and for this omission ask $15,000 damages. The business of the firm has suffered considerable loss by the omission, it is declared, and aside from the damages it is asked that the company be required to issue a new directory.

M. D. Boales of Hopkinsville, Kentucky, has brought suit for $1,000 damages against the Cumberland Telephone Company. He alleged that, while en route from Cleveland last summer, with his son, who was ill, he tried to telephone friends from Guthrie, in order to have suitable accommodations ready when they arrived. He declares he dropped the required toll in the box, but for some reason unknown failed to get connection with the parties he wanted.

The Illinois Supreme court in the case of the Fidelity and Casualty Company vs. the Swedish-American Telephone Company has decided that a liability company has the right to examine books and pay rolls of an assured in order to check up the figures presented by the assured as a basis for computing the premium. The telephone company declined to submit to this examination and suit was brought to compel it to open its books for inspection. The lower court decided in favor of the Fidelity and Casualty company, which now is affirmed by the Supreme court on appeal. The telephone company argued that the right claimed was unconstitutional.

The case brought by the city of Toledo, Ohio, to restrain the Home Telephone Company from increasing its rates of rental above the rates named in its franchise, will not be tried this term of the Supreme court. City Solicitor Denman said that after consulting with the attorney general he decided that it would be best to take a little more time to prepare the city's case. Mr. Denman says that in a somewhat similar suit brought by the city of Findlay the city lost.

The fight of the city of Hannibal, Missouri, to force the Missouri and Kansas Telephone Company to take out a franchise for its Hannibal exchange is being continued. In police court a few days ago the company was fined $150 for violating the ordinances of the city by stringing wires on the streets without obtaining permission of the city council. This is the tenth fine of $150 assessed the company in the past three months. All the cases have been appealed to the Hannibal Court of Common Pleas.

A suit for $5,000 has been brought in the Kane county, Illinois, court on the behalf of the widow of the late Albion Causey, against the Chicago Telephone Company, the Elgin, Aurora and Southern Power Company, the Fox River Heat and Power Company et al., for damages for Causey's death. Causey was a lineman of the telephone company and was working on a line of the company when the highly charged wires of the power companies fell across the line on which he was working, causing his instant death.

By a verdict of a jury at LaCrosse, Wis., in the case of Michael J. Sullivan vs. the Wisconsin Telephone Company the plaintiff was awarded $2,100 for injuries received by his race horse "C. F. W." The action was brought for damages alleged to have been sustained by the horse becoming entangled in one of the defendant company's wires which was hanging down in the street, and cutting his legs so badly that his speed was impaired. The horse is a valuable one, having won a $5,000 purse in a race two years ago.

Some of the lawyers for the poolroom men in New York have made demands upon the New York and New Jersey Telephone Company to replace the telephones which were ripped out of poolrooms by the police recently. The telephone company stated that the matter would be referred to the law department of the company and the contracts examined. Many of the poolroom men had made contracts with the company for a year, and declare that the company must replace the instruments which the police seized or stand suit for damages. It is the intention of the poolroom men to bring such suits, not in the guise of poolroom owners, but as regular subscribers whose contracts have been

S. C. Allen, who runs a grocery store at Perry, N. Y., has a grievance against the Perry Telephone Company, which involves some fine points of law. Mr. Allen thinks he is entitled to $10,000 and has employed counsel. Allen is a member of an association made up of local grocery dealers. Several months ago they agreed not to solicit orders from house to house. Mr. Allen wanted to place an order with a Buffalo wholesale house and tried to call the local company's central office, where connections are made with the Bell long-distance lines. Receiving no reply he went to the central office and was told by the manager that his telephone had been cut off because he had been taking orders in violation of his agreement not to solicit. The manager stated that the Perry Telephone Company had an agreement with the Grocers' Association that no member should solicit orders except over the company's telephones and that the greater part of the company's business came from people who would not use the telephone at $1 a month if they could place their orders some way without having to go downtown. Allen has withdrawn from the combination and declares that he will run his own business.

Telephony.

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TRUTHFUL ❧ FEARLESS ❧ INDEPENDENT

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INDEPENDENT DEVELOPMENT.

ACCORDING to the statement of the president of the Michigan Telephone Association, representing Independent interests, there are at least twenty states of the Union, each one of which has more telephones in operation independent of the Bell system than there are in all of the New England states put together, which are controlled by the Bell concern. In Ohio and Indiana, the telephones in use are divided as follows, according to the statement made on the authority of the Independent companies:

	Independents.	Bell.
Ohio	145,000	89,000
Indiana	107,000	40,000
Total	252,000	129,000

Going further into detail the following comparison is made of Independent and Bell subscribers in a number of counties in northern Indiana and southern Michigan:

	Independent.	Bell.
Elkhart County, Ind.	3,535	350
St. Joseph County, Ind.	3,500	625
Marshall County, Ind.	1,000	31
Kosciusco County, Ind.	1,500	4
Lagrange County, Ind.	900	5
Noble County, Ind.	1,100	400
Steuben County, Ind.	1,265	50
LaPorte County, Ind.	1,250	100
Whitley County, Ind.	1,500	4
Fulton County, Ind.	775	4
Pulaski County, Ind.	250	1
Starke County, Ind.	300	2
Allen County, Ind.	4,000	800
Berrien County, Mich.	1,375	8
St. Joseph County, Mich.	325	33
Total	32,575	2,177

In Elkhart county, Indiana, for instance, the Home company has more telephones in use than the Bell company has in fifteen counties in northern Indiana. The growth of the Independent movement in Indiana has developed to such an extent as to make the Bell company a ridiculous farce in many sections of the country. That portion of the public who were originally antagonistic to competing telephone service, because of the service of the two companies, are now outspoken in their compliments to the Independents for the advanced position they have taken in furnishing up-to-date service at reasonable prices.

In Illinois also there are about twice as many Independent telephones in operation as Bell instruments outside of Chicago, and in Chicago the automatic company has 6,000 instruments in service.

All over the west, and especially outside the large cities, the Independent telephone companies are stretching their wires and are extending their activities even into the New England district. In New York state outside of New York city the Independents have occupied nearly every city and town of importance, and operate more telephones in that territory than does the Bell company. Much the same is true of New Jersey and Pennsylvania, and the Independent movement is spreading southward as well.

It is a singular fact that wherever an opposition or Independent telephone exchange is established the rates are always just about half as high as those charged by the old company when it has a monopoly. Another singular fact is that wherever one of these Independent companies gets a foothold it invariably pleases its customers so well that it becomes the stronger of the two. The explanation is that the regular company has its stock watered to several times its real value and the telephones are made to pay big profits to eastern stockholders. On the other hand, Independent companies are carefully managed without any watered stock and they can afford to do business for only a legitimate profit.

Of course there are objections to the establishment of an

opposition exchange. It is sometimes annoying to have two sets of telephones, but the advantages may exceed the disadvantages. If a business man can get a telephone for $3 a month it is much better for him than if he had to pay $4, and if a residence telephone can be put in at $2 a month it is far better than to have to pay $3. Anyone can put up with a little inconvenience if it reduces the cost of telephoning one-third. And then it is perfectly clear that with two competing exchanges, the cheaper one would eventually get the bulk of the business, providing it gave equally good service.

As a factor in social and commercial life the importance of the telephone can hardly be overestimated.

ANOTHER INDEPENDENT VICTORY.

THE Independents have scored a great victory at Cincinnati by the decision of Judge Nippert in the Probate court, in the case of the Queen City Telephone Company vs. the City of Cincinnati. By the terms of the decree the Queen City company is granted the right to use the streets and to install a complete telephone system in Cincinnati, if it accepts the terms of the court within twenty days from the entry of the decree. (This it has already done.) The court holds that the Independent company is properly organized; that its application to the council was regularly made; that its appeal to the Probate court for a definition of the manner and mode by which it may use the streets and alleys of the city was regular. He concedes the right of occupancy by reason of its charter from the state and defines the mode of use.

The company is required to establish a conduit system in the business districts with poles in the remainder of the city. No bonus is required, but the company must furnish a $100,000 surety bond to insure repairs of streets excavated for conduits. The company will reserve one duct of conduits and one cross arm on poles for the city police and fire alarm service. A franchise had been refused it by the Cincinnati city council. Judge Nippert decided that the Queen City company was entitled to a franchise and in a second supplementary decision granted the franchise.

For years the Independents of Cincinnati have been fighting the Bell company and its allied interests to gain a foothold in that city. Four different companies had been organized—the Queen City Telephone Company, the Interstate Telephone Company, the Fitzsimmons Telephone Company and the Cincinnati Telephone Company—but were unable to get a grant from the city for the use of the streets. They filed an application in the Probate court asking for franchises after the city council had failed to grant what was asked of it. The city filed a motion in that tribunal asking that the defendants state specifically what streets they desired to use, and at what points on those streets they intended to set their poles.

Judge Nippert decided that the right to the use of the streets was one that was granted by the legislature, and it was only the mode of use that becomes the subject of agreement between the municipality or the judicial determination of a court. The effect of the decision, should it be sustained in the upper courts, would seem to limit the power of the city in the matter of granting franchises to corporations seeking the use of the streets, and at the same time would forever break the obnoxious Bell monopoly in Cincinnati, much to the delight and satisfaction of the large majority of the residents of that city, who for years have been in the Bell's grasp.

Cincinnati's answer to the Independent telephone companies' application in the Probate court was along the general lines that the streets are already burdened with all they can stand in the way of either overhead or underground lines for telephones; that there is no necessity for such lines; that the present company serves all the purposes of telephones in that city; that sixty per cent of those using telephones now would have to use two systems if another company were given the right to use the streets.

Judge Nippert called Maxime Reber and other expert telephone men before him, with a view to satisfying himself of the possibility of using the streets for telephone purposes. Mr. Reber said that it was hardly possible that the streets were so full of pipes and wires that telephone conduits could not be built. Such conditions are not found in other cities. Other testimony to the same effect had much to do with influencing Judge Nippert in handing down a decision favorable to the Queen City company.

The stockholders of the victorious Queen City Telephone Company are composed of leading business men of Cincinnati and Indianapolis, Muncie and Fort Wayne, Indiana, together with a few other prominent capitalists and Independent telephone men living in other cities of the country. The officers of the company are: President, Max Silverberg, Cincinnati; secretary, Harry B. Gates, Indianapolis; treasurer, George W. Beers, Fort Wayne. Many of the stockholders are men of great wealth.

The capital of the company is $5,000,000, of which $1,500,000 is paid up. As a matter of fact in the proceedings before the court, which awarded the franchise over the refusal of the city council to give it, the petitioners had to produce the cold cash as a guarantee to the court that the company had the financial ability to carry out its part of the contract.

Following the decision by Judge Nippert, the engineers of the Queen City company were put to work preparing plans and specifications for the underground cable construction which the franchise imposes. The rates the company will charge are $76 a year for business telephones and $36 a year for residence telephones, which is a material reduction from the Bell rates. The franchise is unlimited as to time or rates.

The Queen City company had as its attorneys Bentley Matthews of Cincinnati and Judge Taylor of Fort Wayne, Indiana, while the city of Cincinnati was represented by City Solicitor Hunt and Attorneys John Warrington and Miller Outcalt. The case was hard fought from the first, and the untiring work of the Queen City company's counsel was responsible in no small degree for the favorable decision handed down.

Reports are in circulation that the other three Independent companies seeking franchises in Cincinnati are negotiating with a view to consolidating their interests. It is hardly probable that all four Independent companies will be able to operate in the city in addition to the Bell, and they wish to take a step that will make their position more secure. Work on the plant of the Queen City company will be started within a few months, it is said.

The victory of the Independents in Cincinnati is cause for general rejoicing in the ranks of the Independents throughout the country. Judge Nippert's decision is a deserved rebuke, not alone to the Bell company in Cincinnati, but to the officials of that city who have for years successfully fought the entrance of the Independents into that field. The decree will have the further effect of strengthening Independent securities all over the country, as did the ousting of the Cumberland Bell from Tennessee.

TELEPHONY firmly believes, and its opinion is shared by thousands of conservative telephone men throughout the country, that the reverses at law now being sustained by the Bell company are the beginning of the end of that corporation. Like the Russians at the present time, it is getting just what is coming to it. Let the good work go on.

The telephone cancels distance, delay, formality and superfluous conversation.

WEATHER FORECASTS TO FARMERS BY TELEPHONE.

SO RAPIDLY is the system developing of furnishing weather forecasts by telephone to subscribers in the rural districts that it is not alone possible, but quite probable, that within the next year or two at the outside more than a million farmers in different parts of the country will be receiving these weather bulletins by telephone, and deriving thereby the full benefit of this excellent service, which is furnished by the government to the telephone companies.

Beginning in a small way less than two years ago the system has passed through the experimental stage and has more than realized all the advantages and possibilities that were claimed for it at its inception. Tens of thousands of farmers in nearly a dozen states of the Union are already receiving these daily weather forecasts, which are as nearly reliable as it is possible for science, calculation and human skill to make them, and thousands of other farmers in different parts of the country not yet served with these reports by telephone are clamoring for them. It is only a matter of time when every farmer in the United States who has a telephone will be receiving this weather report service.

So marked and sudden has been the growth of the plan that it is somewhat difficult to say just which state now leads in the movement. In Ohio it is said that more than 40,000 farmers are being bulletined each day with these weather reports, while the number of rural telephone subscribers in Iowa receiving the service is but slightly less. In Illinois, Indiana, Arkansas, Missouri, Massachusetts, New York, Nebraska and other states the plan is being successfully operated and the farmers are loud in its praise hundreds installing telephones in their houses for the sole purpose of receiving these daily forecasts. Admitting that these reports are in large measure dependable, it can readily be seen how desirable they would be, especially in the growing season, when to be reasonably certain of the atmospherical conditions twenty-four hours in advance is often of uncalculable value to the farmer.

The telephonic system of distributing the weather reports was started first in Iowa. It has been a success there. Forty thousand farmers receive the reports daily, besides the special frost and storm warnings. The reports thus reach the people who are interested several hours earlier than can be done by the use of mails.

While the plan of distributing to the farmers the daily weather forecast through the medium of the rural free delivery is meritorious, the telephone system is more simple and more satisfactory, and it is probable that as the farmers throughout the country come to appreciate the commercial value and convenience of the telephone the Iowa plan will be generally adopted. Its *modus operandi* is as follows: The forecast is telephoned to central stations every morning and there the operator rings up a rural telephone line. She waits a moment until all have had an opportunity to get to the telephone, and then hangs up the receiver. Should one of the farmers miss a call he can call up a neighbor and learn what the forecast is.

In Ohio the scheme is worked somewhat differently. The forecast message is telephoned from the Cleveland office of the United States Telephone Company to the long-distance office of the company, where it is sent at once to the larger centers, and from there it is further distributed to all the smaller exchanges. Then any subscriber on any connecting line can get the information without cost by calling up their central station or exchange. Care is taken to insure accurate transmission, and the information is available about 10 a. m., giving the indications for the coming night and next day.

Willis L. Moore, chief of the United States weather bureau at Washington, expresses the hope that the time will come when, with the help of larger appropriations and increased facilities in the country districts, every farming community in the land will have access to the daily forecasts just as the people of the cities now have. And this can only be successfully accomplished through the agency of the telephone.

The action of the telephone companies in different parts of the country in arranging for the distribution of this valuable information is very commendable, and whether those interested get the full benefit of it will depend upon themselves and upon the managers of the local telephone lines.

It is a grand enterprise from first to last, and once again demonstrates the value and possibilities of the rural telephone.

The telephone drops the husk and the shell and deals with the kernel of intercourse.

TELEPHONE COURTESY.

THE telephone is not a developer of discourtesy, for to the courteous in heart discourtesy is unknown. Erroneous conceptions of the value and the utility of the telephone may lead some users to forget its marvelous availability and class it as a commonplace instrument that enables one to display ill-breeding and coarse behavior without fear of serious rebuff.

When business takes John Doe to the door of an office or of a residence how courteously he hastens to explain his name and his mission. But when John calls through the medium of the telephone door, common courtesy and even ordinary grammar appear to be forgotten as he sharply bellows through the transmitter: "Who is this? Talk up, so I can hear you!" Of course, he usually obtains the desired information from the very person who would have quickly slammed the door in his face had he bellowed forth, "Who is this?" when standing on the porch.

Is there no resentment experienced when such grave discourtesy is shown? Yes. And often it takes an ill-defined form that increases with time and ultimately destroys all desire to ever see or hear from that person again. In some cases it leads the sarcastic and cynically inclined to respond with the advice "consult a veterinarian" or "look in a mirror," whenever the discourteous query, "Who is this?" is ungrammatically bellowed forth. And in many cases this certain sign of ill-breeding is accepted as inherent in our social system.

Years ago common courtesy clearly defined as one of the unwritten laws in telephone etiquette that the caller shall explain to the person answering the telephone call that "This is John Doe talking. Are you Richard Roe?" or "I have an order to place," and so forth. But that was years ago. And a great many persons don't recognize such a thing as telephone etiquette anyway, more's the pity.

The telephone concentrates thought, brings out the essential points, and makes the complex problem a simple one.

TELEPHONE INDUSTRY IN THE UNITED STATES.

THERE has just been issued by W. M. Steuart, chief statistician of the Department of Manufactures, in the Bureau of the Census at Washington, a preliminary report on the telephone systems of the United States for the year ending December 31, 1902. This is the first report of the sort that has ever been undertaken in this country, and when it is later issued in complete form it will be of inestimable value to all those interested in the telephone industry. The results of the inquiry made by

Mr. Steuart and his aides appears on another page of TELEPHONY.

While the report is in a condensed form, it covers all the really vital features in the situation and should be carefully studied, as it clears up numerous points that have been under discussion, as to the real extent of the telephone industry in this country—capital invested, number of systems, etc.

And yet these statistics should not be taken as giving a true status of the telephone situation at the present time, as the growth of the Independent movement since 1902 has been the greatest in its history, and were a telephone census to be taken to-day it would show the Independents far in advance of their competitor in every particular, except, perhaps, the matter of capitalization.

It will be seen by referring to the figures that the telephone industry represents a capital of just over $452,000,000, taking in slightly over 4,100 systems, with 2,315,297 telephones of all kinds, over which were exchanged during the year 1902 the extraordinary number of 5,070,555,345 messages. Bell, Gray and Edison never dreamed of such loquacity when they were working on the telephone back in the '70's. The number of subscribers is given at 2,137,256, or about 175,000 less than the total number of telephones then in use. This industry employed 64,628 wage earners, to whom was paid $26,369,735, and 14,124 salaried officials and clerks, to whom was paid $9,885,886. The revenue derived from the industry reached the enormous total of $86,825,536. The expenses for the year were $61,152,823. The interest on bonds was $3,411,948, and the dividends paid were $14,982,719. Operating expenses of all the companies were 70.4 per cent of gross. Including interest, the ratio was 74.4 per cent. Maintenance figures, which would be highly interesting, are not given in the report.

The number of Bell instruments outstanding in 1902 was 3,150,320. As the Bell companies count transmitter and receiver as two instruments, the number of Bell telephones was 1,575,160. The number of Independent telephones in 1902, therefore, was 740,137, or, allowing for Bell telephones in Canada, probably about 750,000. The number of Independent telephones, consequently, was about one-half the number of Bell telephones.

In the matter of subscribers, the division cannot be made so accurately, since it is evident that the Bell companies compute the number of subscribers upon a basis unlike that of the census bureau. Deducting the number of Bell subscribers in 1902, 1,277,983, from the total in the United States, 2,137,256, leaves for the Independents 859,273, or more than the number of Independent telephones.

The amount of gross earnings indicates that the average cost per "talk" to the public was 1.7 cents. The census figures bring out the very interesting fact that the average earnings of all the telephone companies per subscriber in 1902 was a little over $40.

It is interesting to note the growth of the telephone industry since the close of the year 1902. The number of Bell telephones now outstanding is a little over 2,000,000 (4,000,000 instruments), and the number of Independent telephones is now fully 3,000,000. This would make a total of over 5,000,000 telephones now outstanding in the United States, compared with 2,315,297 at the close of 1902

Back of the employes of the telephone companies stand the men who made the 4,850,486 miles of wire they have had strung and the other supplies they have had occasion to buy. But for the telephone there would have been less employment for workers in copper and steel. The total of single wire for the whole industry at the time the census was taken was about equally divided between the Independent and Bell companies; and this in the face of the amazing fact that the Bell company had been in operation for twenty-five years, while the Independent movement was less than seven years old! Since the close of 1902 the Independents have left the Bell companies far in the rear in the matter of mileage, as well as in general development.

Perhaps the most interesting single feature of the report is that which shows the extent to which rural telephony has grown and extended in all parts of the country, and particularly in the west. The report includes 994 mutual systems, which are all of rural character, with 89,316 instruments, and 70,915 miles of single wire. In addition to these the commercial companies operate 15,598 rural lines, with 138,426 miles of single wire and 121,905 telephones. The report also included 4,985 Independent farmers' lines, with 49,965 miles of single wire and 55,747 instruments. These figures, added to the others quoted above, give a grand total for continental United States of 9,136 systems and lines: 4,900,451 miles of single wire, and 2,371,044 telephones—a most remarkable showing in every particular and one that easily leads the whole world.

Nor was this all, for in addition to the statistics presented above for continental United States, reports were received for one commercial system in Alaska and seven in Hawaii, having a total of 4,732 miles of single wire, 2,493 telephones of all kinds, 3,461,000 messages or talks during the year, $112,068 total revenue, $76,307 total expenses (including taxes and fixed charges), and $25,858 paid in dividends, leaving a net surplus of $9,903.

It is generally conceded by expert telephonists that the increase in the investment in telephony amounts to nearly $75,000,000 a year, over half of which sum is credited to the Independents. Taking into consideration this marvelous growth of the telephone industry, it is almost beyond comprehension to think of what statistics a half dozen years from now will show in the way of general increase.

The Steuart report is remarkable in many particulars and much credit is due the men who compiled it. It will be found useful in a thousand ways, even in its condensed form, and the complete report, which, it is announced, will be issued soon, besides constituting a basis of comparison for all time, will be a most valuable addition to telephone literature.

Swift said that the man who made two ears of corn or two blades of grass grow where only one grew before had conferred a greater benefit on his country than the whole race of politicians. What shall be said in praise of men who make an invention which gives direct employment at good wages to 80,000 of their fellow citizens and citizenesses, who might otherwise find it hard to get something to do? The politician cannot compete with the inventor as a public benefactor.

The telephone changes plans, gives sanctions, secures counsels and grasps opportunities.

POSSIBILITIES OF THE TELEPHONE.

OCCASIONALLY someone tries to make a forecast of what is to be expected in years to come by reason of the continuance of the remarkable advance in the arts and sciences. One of the favorite predictions has been based upon the possibilities of the telephone, and writers only a few years ago were accustomed to tell of the coming day when it would not be necessary to leave the home to participate in great assemblages and distinctly hear what was said and done.

It is, therefore, with no expression of surprise that the information is received that the idea was given a practical demonstration in Philadelphia recently. There by a convenient arrangement of megaphones and telephones, the Rev. Dr. Russell H. Conwell of Grace Baptist Temple was able to preach to his congregation and at the same time have his voice and the singing of the choir heard by nearly a hundred patients lying on beds of suffering in the Sa-

maritan hospital. It was the carrying out of a feasible idea and its success is vouched for. The newspaper accounts of the unique experiment tell how many hearts were cheered by the services brought to them when they could not go.

A little love tale in one of the current magazines fancifully tells of an imaginary wedding ceremony performed with the bridegroom in New York, the bride in Boston, with bridesmaid, groomsman, members of the bride's family and witnesses connected on the same line holding separate telephone receivers to their ears. At the present rate of progress and achievement a few years may demonstrate that the story has not been overdrawn in any of its particulars The telephone presents great and unlimited possibilities, many of them perhaps still unthought of or not at the present time deemed practical. It is no exaggeration to say that the telephone is still in its infancy and that its development in the future will exceed even the wildest dreams of the telephonists of to-day.

An hour at the operator's desk would beget a kind and courteous sympathy for unsuccessful effort.

TELEPHONES AT A CONVENTION.

THE most interesting innovation to be introduced at the national Democratic convention, to be held in St. Louis this month, has been announced by the subcommittee on arrangements. A complete telephone system is to be installed in the big Coliseum. By means of switches placed about the floor the chairmen of the different state delegations will be able to get into communication with the chairman, and it is expected that there by the work of the convention will be greatly facilitated and much time saved.

The telephone is one of the greatest conveniences of modern life, but, like all useful inventions, it has the defects of its qualities. The telephone method of catching the ear of the presiding officer may generate an amount of heat dangerous in the case of corpulent and excitable statesmen. What would be the sensation of one of these distinguished persons if he rang up the platform and was informed by the switchman that the wire to the chair was "busy"? Would he be willing to give his number and wait patiently for his opportunity? If the usual five minutes of commerce were permitted in the case of each person who talked with the wielder of the gavel, how much time would he have free to direct the proceedings of the great assemblage? It would be unreasonable to expect him to keep his ear glued to the receiver while he kept one eye on the delegates and the other on the galleries, filled with eager and noisy partisans.

Perhaps a way out of the difficulty would be to appoint two chairman, one to attend to the telephone and the other to attend to business. Otherwise the boss of the big gathering at St. Louis will look back on his experience there as the most strenuous in his life, rivaling that of "Uncle" Joe Cannon at the now famous Illinois Republican state convention.

If the prospective chairman had any say in the matter he would not have much sympathy with the complaint of the Hon. J. K. Jones of Arkansas, who has charge of the arrangements. It appears that the telephone plan was adopted for this, among other reasons—that it was expected that the convention would be the biggest on record. The committee had been led to believe that the hall would accommodate between 12,000 and 15,000. But, as a matter fact, it will be only capable of seating a beggarly 10,000, and that at a pinch. There is really no reason to regret this state of affairs. A big crowd is not likely to promote the deliberative calm of the convention itself. The more spectators there are, all anxious to shout, the harder the work of the officers of the body. The threat to clear the galleries would be greeted with jeers and derision when the lookers-on were conscious of their numerical strength.

The telephone system ought to prove very useful to the chairman if any section composed of admirers of some particular candidate kept on making an uproar. He could communicate readily and rapidly with the officers of the law, if necessary, and organize a demonstration in force against the disturbers of the peace. In modern war-like operations rapid mobilization, dependent as it is on a perfect system of communication, is of prime importance.

It will be interesting to watch the outcome of this experiment with the telephone at the St. Louis convention. If it proves successful, as the promoters of the plan confidently expect it will, it may mark a new era in the method of conducting conventions of this sort and open up still another new field for the telephone.

What the telephone has wrought in the past is but a fair index of what it will accomplish in the future.

THE INTERNATIONAL ELECTRICAL CONGRESS.

ONE of the many reasons why large expositions are very valuable as well as very entertaining is that their existence makes possible congresses and conventions which would not be fully attended if they were held under other circumstances and at other times. When the peoples of the earth are gathered together in friendly emulation to display what they have done with their hands and their heads, and to see what others are showing, the coming together of those interested in similar lines gives an opportunity for discussion and the reaching of basic agreements which can hardly be accomplished any other way. Much of the accuracy of present electrical knowledge and much of the advantage of the present universal electrical nomenclature are due to the holding of congresses in the past. The gathering in Chicago in 1893 was remarkable for the attendance of notables and the coming together of the thinkers.

The International Electrical Congress, which will convene in St. Louis during the week of September 12 to 17, will give an opportunity for the presentation of the results of special study and will elicit discussion, which, added to the papers, will make a series of most valuable contributions to electrical literature and knowledge. The congress section, which includes telephony, has already made provision for notable papers. From what is known of the character of the writers, of the thoroughness of their study, and of the importance of the subjects to be given consideration, it is safe to predict the most valuable results.

The possibilities of the telephone are limited only by the genius of man.

RURAL TELEPHONES.

FARMERS' telephones came into existence wholly as an Independent movement which originated with the farmers themselves and the economy of service belongs entirely to their independence. This can be maintained just so long as control is held by Independent companies or organizations. Merged with a big corporation, one that is operated by parties not residents of the state, independence and control and economy will be lost, and can be regained only by building new lines—that is, doing the work all over again.

Rural telephones are a necessity. With the interurban railway and the rural mail route came the rural telephone. It preceded the rural mail route, but not to such an extent as to cause its advantage to become generally appreciated. Uncle Sam's generosity in providing men to deliver mail

to our country homes proved to be a reminder that other advantages might be enjoyed by the ruralist, and the greatest of these advantages is the telephone.

The chief source of dissatisfaction among farmers' families with the life they lead is that they are isolated from the rest of the world. The work becomes monotonous. The farmer wears along from day to day without an opportunity to exchange a word or an idea with anyone else, and in many cases interest in the farm work is often lacking in that diligence necessary to produce the greatest results.

In every locality in which the telephone and rural mail routes have been installed there is greater contentment; a tendency to improve the social as well as industrial conditions; a spirit of progress and zeal that was lacking is now apparent. There is nothing that adds more to the pleasure of living or helps in business and work than proper intercourse with our fellow-men. The rural telephone is the best means to this end.

There is no reason why a majority of the farmers of today should not enjoy advantages almost equal to people who live in cities.

The telephone is the handmaid of commerce and the untiring aid of progress.

DENIES BELL INVENTED TELEPHONE.

FRANK G. CARPENTER, the well-known writer, recently had an interview with Alexander Graham Bell, the patentee of the telephone, in which Bell took to himself all the credit for the invention of the telephone, and indirectly cast a slur upon the name of Dr. Elisha Gray, who, as the records at Washington will show, solved the problem of sound transmission and made application for a patent two years before Bell asked for a patent on the telephone. This was the origin of the speaking telephone. The Carpenter article was published far and wide, and the thinly veiled and slurring allusion to Dr. Gray has aroused the friends of the dead inventor of the telephone to speak in his defense. Writing to one of the Chicago papers, W. M. Goodridge of Highland Park, Illinois, who was for many years Dr. Gray's right-hand man in the latter's work of perfecting the telephone and giving to the world other electrical inventions of great value, says:

I have read with a good deal of interest an article by Frank G. Carpenter, headed, "Bell and His Work." In this article, among other things, Mr. Bell says: "I don't believe any electrician could have invented the telephone."

As a matter of fact, the telephone was invented by Elisha Gray of Chicago, an electrician and inventor of world-wide reputation. Mr. Gray went into the patent office with an application for a patent on a system of sound transmission, telegraphically, in April, 1874, almost a year before Mr. Bell appeared in the patent office with an application for a similar purpose. Mr. Gray experimented continuously from the spring of 1874 to the spring of 1876, improving his apparatus for the transmission of sound by electricity.

The writer of this article was associated with Mr. Gray ten years, commencing in April, 1874, assisted him in every experiment he made, knows just what he did, and also what he expected to do with his invention. Multiple telegraphy was the principal object of his invention and to this feature Mr. Gray devoted most of his time and energy, but the speaking telephone was included in it and was in his mind from the very start, and frequently the matter was discussed between us as to the construction of instruments for the purpose. Each succeeding experiment served to confirm him in his idea of the proper instruments and led up, finally, to a fixed plan in his mind which he proceeded to embody in a caveat which he filed in the patent office in Washington in February, 1876, to protect his rights until such time as he could give it proper attention.

This caveat contained the first description of a speaking telephone given to the world, and it is a significant fact that Mr. Bell never succeeded in devising an instrument that would transmit speech, nor ever transmitted a word by electricity until nearly a month after this caveat was filed in the patent office, and then only by the use of instruments that were fully described by the specifications and drawings in said caveat.

Were Mr. Gray now living he would reply to Mr. Bell's article. Being nearest to him in all the work which he did, and knowing a great deal more than he stated in this article, I could not let it pass without a word in his stead. A short time before his death Mr. Gray wrote these words:

"The history of the telephone will never be fully written. It is partly hidden away in 20,000 or 30,000 pages of testimony, and partly lying on the hearts and consciences of a few whose lips are sealed, some in death and others by a golden clasp whose grip is tighter."

Some day enough may be gathered from this mass of testimony to show conclusively to whom the honor of the invention belongs.

The telephone in its highest development is a true mirror of Yankee civilization.

PARTY LINES.

THE demand for telephone service is universal. A further telephone development of any population is impossible only when there are enough lines and enough telephones wholly to care for the telephonic need; but at the prices for which telephone service is now sold, many must do without the service. If there is to be at least one telephone for every house and every office, the price must be reduced or the wealth per person of a large part of the population must be increased. There seems to be no immediate likelihood of the latter change taking place, so that if the complete development is to be reached at all, the service must be lower in price.

If the service is all to be given over individual lines, the cheapening of the price must come by a lowering of the net cost or reducing the margin of profit, or both; and so far as averages, at least, are concerned, there is not much room for reducing the price, except by cheapening the cost of production. To reduce this production cost, it would seem that we must either build the plants cheaper and still have them good enough, or reduce the cost of the labor involved in operating the plants and keeping them in condition, or we must find some new way of giving telephone service. The latter seems not immediately likely, because there is no epoch-making discovery or invention in sight of a character to cheapen the cost of that most expensive portion of the property, the outside line plant.

If, then, there is no immediate hope of building sufficiently good and much cheaper lines; if telephones and switchboards are still to remain respectable absorbents of investment, and if the resulting price of individual line service is to remain a little out of the reach of a large class of possible users, there seems to be no immediate way of reaching a really large general development than to subdivide the cost of operating a line by putting a number of subscribers on it. Until party lines are no longer necessary, there will exist a need for a system in which there is not a fixed limit to the number of stations, and in which selective signals and perhaps secrecy are simply and practically accomplished.

CHURCH SERVICES BY TELEPHONE.

A church service in which the sermon was preached from a telephone booth and the audience was scattered over the southern part of Audrain county, Missouri, was conducted on a recent Sunday night by Dr. W. T. Moore of Columbia, Missouri, dean of the Missouri Bible College. Dr. Moore preached at a country church near Benton City in the morning, but a severe rain storm in the afternoon made an evening service in the church impracticable. Nearly all the church members live on a party line, and at the suggestion of one of the members, Mr. Moore made arrangements to hold services over the wire. The meeting began at 8 o'clock, and was opened by song, every one singing into his respective telephone. Prayer was offered, after which the sermon was preached, followed by the congregation singing the "Doxology" and ending with the benediction. Every detail of the usual service was conducted except the taking of the collection.

Berlin Teletyping Central Station

DR. ALFRED GRADENWITZ

ON OCTOBER 1, 1903, a most valuable addition to the Berlin telephone, with its nearly sixty-eight thousand subscribers, was made, when the Ferndrucker-Centrale was opened to public service. Telephones, which only render words as they are spoken, are frequently inefficient for business purposes; in addition to a correct transmission of a communication, there will, in many cases, be necessary an acknowledgment in writing of this transmission. On the other hand, there is the liability of telephonic conversation being overheard by a third party, and finally the person rung up on the telephone may happen to be absent, when his return will have to be awaited for and much time lost. In all these cases, the new teletyper service is intended to afford efficient means of communication, writes Dr. Alfred Gradenwitz in *Electrical Review*.

The teletyper (Fig. 1) as constructed by the Siemens & Halske Company is a type-printing telegraph, similar to the well-known Hughes type printer and the Baudot telegraph. The main distinctive feature from former apparatus is, however, the fact that the latter moving freely, the synchronism of the instruments established on the same line had to be obtained by the skill of the operator, whereas the operation of the new apparatus being nothing else than a teletype-writer may be learned by anybody in the shortest possible time. The keyboard of the teletyper (Fig. 2) is similar to that of an ordinary typewriter, comprising four superposed rows of seven keys each, out of which twenty-six are each provided both with a letter and a figure or sign of punctuation. As regards the remaining two keys, one serves as beginning or letter key, whereas the other, bearing the inscription "Zahl," is used as figure or punctuation key. By striking either of these keys, the type-wheel of the printing telegraph is adjusetd either for letters or figures in a manner similar to the Hughes apparatus. Both of the apparatus connected by a line may be used either as sender or as receiver without any special preparation or switching being necessary, both of them being automatically and simultaneously operated as soon as the first white key is struck, when the apparatus in question becomes a sender, and all is ready for use.

FIG. 1.—THE TELETYPER, INSTALLED IN BERLIN, GERMANY.

The type-wheel bears on its periphery, in one circle, the letters and in another parallel circle the figures and signs of punctuation. On acting on the shift key, the type-wheel is shifted automatically on its shaft so as to place the row of signs concerned above the printing surface of the paper ribbon. By acting on an ordinary key, on the other hand, the type-wheel is rotated as far as to bring the type in question in front of the paper, when the latter is pressed against the wheel and receives the printing, to return downward again simultaneously and to be removed as far as the interval of two letters, so as to be able to receive the following sign. This process will occur simultaneously in both of the apparatus connected by the line; i. e., both in the transmitter and receiver, being automatic in the latter, no matter whether there is or is not somebody operating the receiving apparatus. In the case of the owner of the apparatus being absent, the telegram may be read on the paper ribbon on his return. The electric printing telegraph will thus give two perfectly similar records of the same telegram, one on the sending and the other on the receiving apparatus.

As soon as the beginning key is pressed downward, the circuit of the transmitting apparatus is completed, resulting in a switching roller being set rotating, throwing electric currents of alternating directions into the printing telegram circuit and through the line relays connected to the apparatus; the latter will insert both in the transmitting and receiving apparatus local currents, which, by means of so-called magnets, produce the rotation of the type-wheel from the initial position identical in all the stations. Now, in the case of a letter key being pressed downward, a peg attached to the other end of its lever will strike against the rotating switching roller brush, stopping the latter and thus the type-wheel of the printing telegraph. At the same time the type levers of both apparatus being attracted will cause the corresponding letter to be printed. As long as the key is pressed downward, the type-wheels are incapable of moving any further, thus enabling the transmission to take

place at any desired speed. After a telegram is transmitted, both the transmitter and receiver will be switched out automatically at a certain position of the type-wheel, the apparatus thus being stopped automatically. Twelve accumulator cells built into a box serves as a working battery. The tension of about twelve volts as obtaining in the line circuit is so low as to exclude any possibility of an inductive influence of printing-telegraph circuits on neighboring telephone circuits.

The working of the apparatus is shown schematically in Fig. 3. In the receiving apparatus, shown to the right, the wire is led to the ground through the windings of the relay r^1. A current of rapidly alternating direction, traversing the line, will cause the tongue of this relay to move to and fro rapidly, the local circuit containing the pressure magnet d, and the polarized adjusting magnet e, being alternately applied to the outer poles of the two-pole battery. While the heavy pressure magnet is incapable of following the rapidly alternating currents traversing it, the adjusting magnet will move the armature of the escapement synchronically, allowing the type-wheel to proceed by steps. In the case of the alternating current of the line ceasing and a current being kept on for some time in one direction, both the adjusting magnet and the type-wheel being stopped, the pressure magnet will be allowed to attract its armature and to print a type. In the sending position, the line is applied to the battery through the inverted relay and a commutator, the brush of which is moved synchronically with the type-wheel, when the battery current traversing both relays will invert their tongues, the adjusting magnets allowing the type-wheels to proceed one step and the brushes of the commutator being adjusted for the subsequent contact. The direction of the current in the line will thus be inverted, the tongues of the relay returning backward, and so on, the type-wheels running synchronically until the brush on the commutator of the sending apparatus is arrested by a key pressed downward, when both apparatus being stopped will cause the type desired to be printed.

The mechanical arrangement is shown in Figs. 4 and 5. The electromotor shown at the right has a vertical axle stretching the spring 1. As soon as the force of this spring has assumed a certain magnitude, the vertical pressure of the worm-wheel u against the worm would be strong enough to lift the armature resting below on a lever, resulting in the two carbon discs t being removed from one another in a direction practically parallel to the tangent in their point of contact. The motor current will thus be interrupted, to be completed again as soon as the tension of the spring has been lessened by its unwinding. The two carbon discs are provided with click springs, so as to

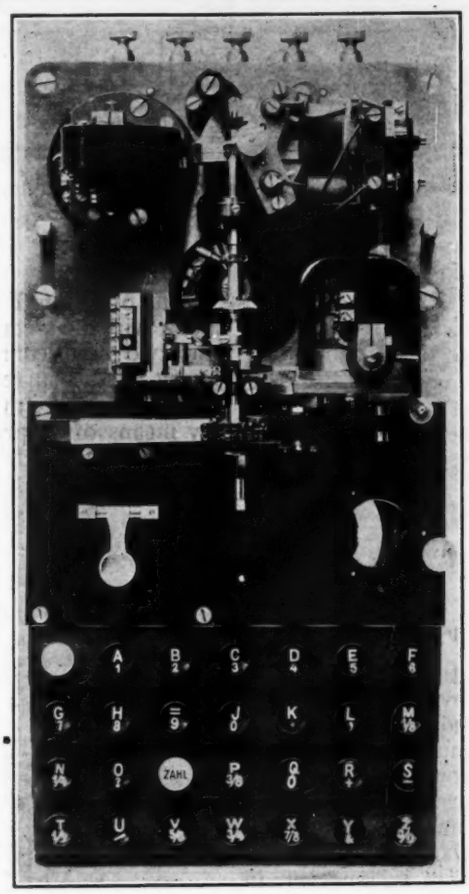

FIG. 2.— TELETYPER WITH COVER REMOVED.

turn continuously while the contact is working, the places brought into contact being renewed continually. In the middle of the axis the conical wheel m is arranged, engaging with a similar wheel n (Fig. 5). To this wheel, the arm p being capable of being arrested by rods connected to the various keys, is connected through an elastic coupling, while the brush o, sliding over the commutator segments, is rigidly connected to p. A singularly shaped spiral is cut into a continuation of the conical wheel m; to this is applied an arm q, being shifted to the left through the rotation of the shaft, moving at the same time toward the axis. In pressing down the beginning key, as well as in any movement of the pressure lever, the piece g is turned, the arm q thus being allowed to apply itself to the upper part of the spiral.

The advantages afforded by the printing telegraph as compared with telephone and present telegraph systems will be evident. Like the telephone, the printing telegraph may serve for a direct communication between two persons over any distance, but has the additional advantage of any hearing mistakes or other misunderstandings being excluded by the double and simultaneous reproduction of the communication in printing. As above stated, the printing telegraph will at the same time make it impossible for a third person to overhear communications, which is even possible in the case of the Morse telegraph. This is, therefore, the only means of communication enabling dispatches to be kept strictly private.

The central station (Fig. 6) just opened is fitted with a switchboard having indicators and catches for one hundred subscribers. Sixteen connecting strings allow thirty-two subscribers being simultaneously connected, so as to enable a simultaneous communication between a third of all the subscribers in the case of the switchboard being complete. As soon as a suscriber presses down the calling key

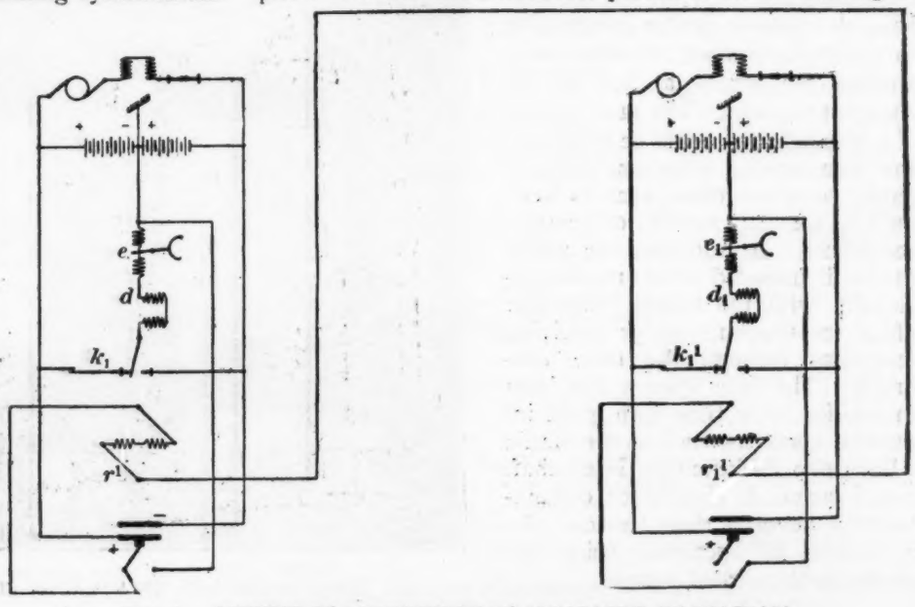

FIG. 3.—SCHEME OF CONNECTION OF APPARATUS, IN DIAGRAM.

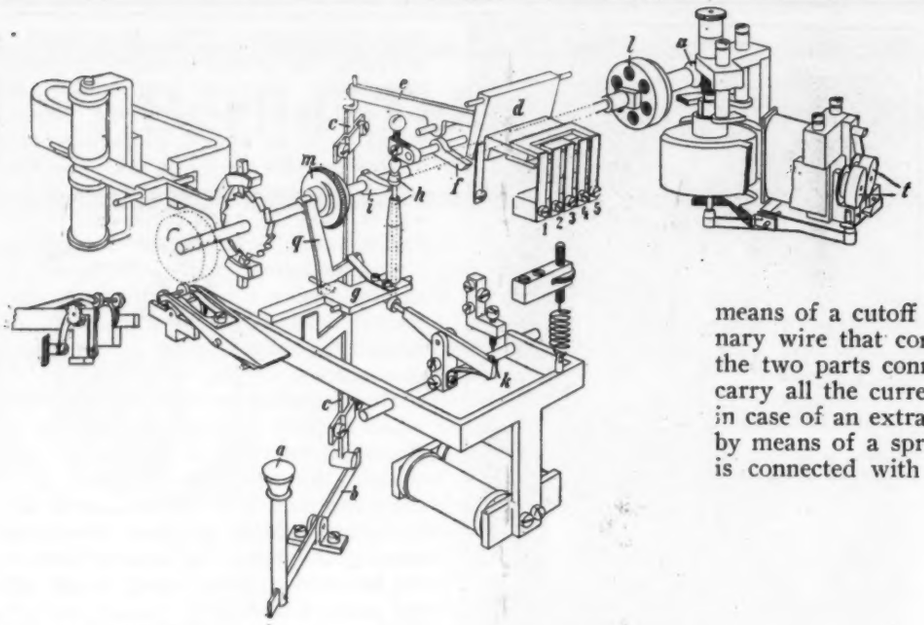

FIG. 4.—MECHANICAL ARRANGEMENT OF THE TELETYPER.

of his teletyper, the official in charge of the indicator board of the central station will be advised by the indicator of the subscriber in question dropping and an alarm being rung, when he will put himself in communication with the caller, in order to ask for the desired connection and connect both subscribers so that their apparatus are ready for direct communication. This shows the similarity of service with telephone service and the great advantage of any two subscribers communicating directly. There is, however, in addition, the possibility of connecting any desired number of subscribers to the same printing telegraph so as to transmit the same communication simultaneously to all the subscribers.

Similar telegraphic services from one central station to a certain number of subscribers simultaneously by a so-called "ticker" have for some time been in use in New York, London and Paris. A similar service has been in operation also in Bremerhaven, Germany, for transmitting ship telegrams from one central station to one hundred subscribers in different places. The central station just opened in Berlin is also intended in addition to mutual communication between the subscribers, to transmit similar information to a certain number of subscribers, limiting the service at first to exchange telegrams. The same system of communication could be employed for transmitting telegrams from a central telegraph office, such as Reuter's, to a certain number of newspaper offices. In addition, the above central is intended to secure communication with the central telegraph office for transmitting or receiving telegrams through the state telegraph. The new system has been in use for some time with great industrial concerns, such as the Berlin Allgemeine Elektricitäts-Gesellschaft and Siemens & Halske for communication between their various departments, its operation being attended with marked success.

TO PROTECT TELEPHONES.

Frank P. Bell of Fairfield, Washington, is the inventor of a device which he claims will prevent lightning from striking a telephone and ruining the instrument or giving the person who may be using it at the time a shock. Mr. Bell has just received a patent on his invention, which he names "Bell's Automatic Cutoff in Time of Storm." By means of a cutoff box, placed near the telephone, the ordinary wire that connects with the telephone is severed and the two parts connected by a fine wire or fuse. This will carry all the current necessary for telephone purposes, but in case of an extra high voltage the fuse is burned out, and by means of a spring, which the fuse releases, the current is connected with another wire that leads to the ground.

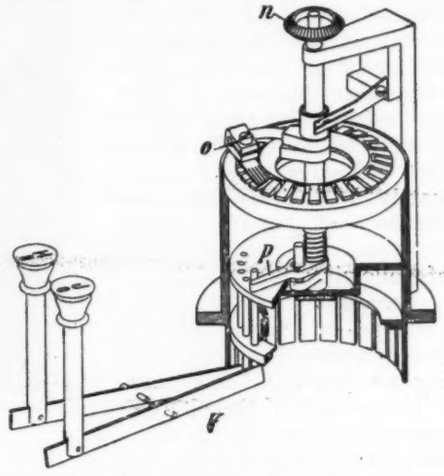

FIG. 5.—COMMUTATOR AND KEY ACTION.

After the accident a new fuse can be put in place in two or three minutes and at practically no cost. Mr. Bell gave his invention a practical test a few days ago. He connected one of the boxes with his telephone, lightning struck the barbed wire and the fuse immediately burned, preventing any damage to the instrument.

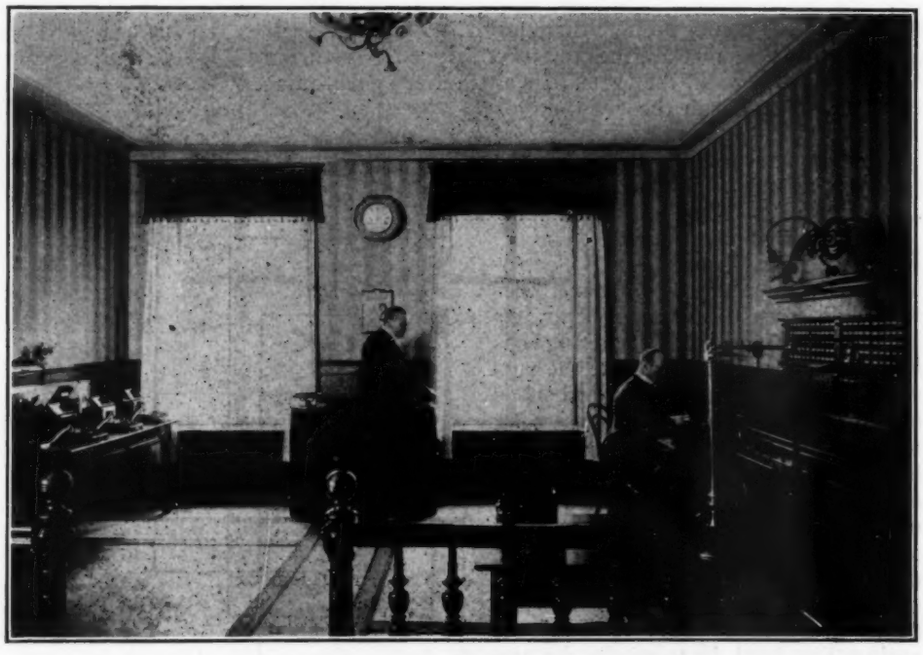

FIG. 6.—BERLIN TELETYPING CENTRAL STATION IN OPERATION.

Convention of New York Independents.

THE New York State Independent Telephone Association convened June 23 and 24 in second annual session at the Genesee Hotel, in Buffalo, New York. More than 100 members of the association, as well as guests from other states, were present.

The organization was formed three years ago, and has had a marvelous growth. It now represents 600 exchanges and 150,000 telephones in all parts of the state, meaning an investment of some $20,000,000.

The session Thursday afternoon was called to order by the president, George R. Fuller of Rochester. President Fuller introduced Councilman Thomas Stoddart, who made the address of welcome on behalf of the mayor, who was absent from the city. Mr. Stoddart's words were very pleasing, and were warmly received by the delegates present.

The response to Mr. Stoddart was made by President Fuller, who said:

For the Independent telephone men of the state of New York, both present and absent, I thank you sincerely and heartily for the cordial welcome you have extended to the attendants at this convention. We were much favored in receiving an invitation to hold our annual convention in this beautiful city, and I assure you that we have been greatly honored and made very happy in receiving so courteous a welcome by a representative of its chief magistrate. I think, Mr. Stoddart, that it will be news to many of your people, if not to yourself, to learn that not less than thirty of the active Independent telephone companies operating in this state have headquarters in your city. You should be proud of the fact that of all the great cities of this great Empire State Buffalo takes the lead in the interests of its citizens in Independent telephone development and operation. It is, therefore, very appropriate and fitting that Independent telephone men should gather here for the purpose of getting better acquainted one with another and acquiring more knowledge in our particular line of work by an exchange of experience and for social enjoyment. It is also a matter of gratification to us to be so handsomely recognized by a city of the state second only in population and importance to our great metropolis, and I believe it is pardonable egotism to suggest that we anticipate the time is not far distant when we shall have the extreme satisfaction of convening in the city of New York by invitation from a strong, loyal, prosperous Independent company operating within its boundaries.

Again I thank you, Mr. Stoddart, for your hearty and gracious welcome. May we take it as an omen of generous patronage and loyal support of your Independent Frontier Telephone Company on the part of the citizens whom you represent. While sojourning here I trust our deportment, numbers, and our enthusiasm will convince the good people of Buffalo that Independent telephony is not confined in great part to wire fence and farmers' lines, as has often been reported, but is an important factor in the affairs of the state and nation, worthy of recognition by the public and consideration as a source of investment by the capitalist.

President Fuller then read his annual address, which is reproduced in full, as follows:

It gives me much pleasure to greet you on this, the second occasion of our annual gathering. You have undoubtedly observed that there exists a strong fraternal spirit among Independent telephone people everywhere. A few days ago a gentleman, who is manager and a large stockholder of a successful Independent telephone company in Shanghai, China, called at our exchange. He has been a prosperous merchant in that city for twenty years. The same old experience with exorbitant rates and deplorable service forced him and a few of his associates to organize an Independent company. Previous to the organization of this company the minimum rate charged for telephone service was equal to $60 per year. The rates of the new company are $22 per year for business houses and $18 per year for residences, giving unlimited service on individual lines, through an exchange of 2,500 telephones. They have paid eight per cent annual dividends on their stock since the opening of the exchange, four years ago, and have a surplus equal to one-third of their capital stock. The gentleman is in this country looking for new apparatus and studying the methods of the Independent companies. He has all of the enthusiasm for the work that any of the American Independents have, and if he had not told me where he was from I should have said he was connected with some Independent company in a neighboring city.

The consciousness of sympathy and enthusiastic support from the people in their eagerness to rid themselves of a most oppressive monopoly, the active part we are taking in the rapid scientific progress of the age and the common experience of repelling unjust and unwarranted attacks of our opponents, bring something of exhilaration and joy in our work and a brotherly feeling for all engaged in it. Wouldn't it be a good plan to organize a secret society of Independent telephone men and make the penalty for disloyalty or affiliation with our common enemy banishment from the society of all decent and honorable men?

During the past year the same marvelous development of Independent telephony has continued, and in no section has there been greater increase than in New York state. Men have ceased to estimate the limit of equipment required to provide for telephones. It is no longer a question of *getting* business, but of taking care of it. This applies both to local and toll service. Four years ago our Rochester exchange was opened with a switchboard of 3,600 capacity, equipped with 2,500 lines. In making an estimate for apparatus it was considered by the best engineers that a board with an ultimate capacity of 2,500 lines would be ample for all future demands. To be absolutely sure, however, of capacity sufficient for all of the telephones that would ever be used in our city, in May, 1900, a board with an ultimate capacity of 3,600 lines was opened for service. In two years' time this was filled. The following autumn a new board with a capacity of 7,200 lines took the place of the first board. At the present rate of additions another year will force us to make provision for a still greater capacity. This illustrates the condition in every place where Independent telephone companies are operating. More has been accomplished by the Independents in telephone development in the United States in four years than was accomplished by the Bell company in twenty-five years. And outside of New York city more has been accomplished in this state in the last two years than was accomplished by the Bell company in the preceding twenty-seven years.

The following statement issued by the Boston News Bureau under date of February 27, 1904, is as reliable as any statistics we have on the subject:

"An electrical engineer who is familiar with the Independent telephone movement has compiled the following figures showing the growth of Independent telephony since 1900:

Authority.	*Year.*	*No. Telephones.*
Twelfth census report	1900	700,000
Manufacturers' statement	1901	1,000,000
Manufacturers' statement	1902	1,370,000
Manufacturers' statement	1903	1,695,000

"The manufacturers' statements report an output of from 500,000 to 550,000 per annum, and in estimating the increase thirty-five per cent has been deducted in each year for replacements, etc. The above estimate does not include telephones on farmers' lines or interior systems, which comprise not less than 350,000 telephones. The total number of Independent telephones outstanding is estimated at 2,000,000. The Independent telephone companies always count transmitter and receiver as one telephone, while the Bell companies count them as two. The number of Bell instruments outstanding at present is reported as about 3,800,000, which would compare with 4,000,000 Independent instruments.

"The number of Independent exchanges in 1902 was 5,430, with an average of 252 subscribers each; the present number is at the lowest estimate, 6,000, an average of about 285 subscribers. While the average number of subscribers for each exchange is small, the cities of Philadelphia, Pittsburg and Allegheny, Cleveland, Minneapolis and St. Paul, St. Louis and Los Angeles average 10,000 each for these six systems, while the cities of Baltimore, Rochester, Buffalo, Toledo, Columbus, Dayton, Louisville, Indianapolis and Grand Rapids average 6,200 each, computed from signed statements received December, 1903. About seventy-five per cent of all the cities in the United States having a population of 20,000 or over have Independent telephone companies."

This report was brought down to the close of 1903. The manufacturers report a constantly increasing demand, and the above report shows an increased output of Independent telephones each year over the preceding year of from twenty-five to forty-five per cent since 1900. Therefore, an estimate of from 2,350,000 to 2,500,000 Independent telephones in use in the United States to-day, operated by 7,000 companies, would be conservative. The marvelous part of this is the fact that of these 7,000 companies, with an investment approximating $200,000,000, only about twenty-five have been unsuccessful financially, and in most cases of financial embarrassment provision has been made for continued operation by reorganization.

In the statistics of telephone development in the United States

for the year 1903 it is estimated that 4,300,000 miles of wire had been strung; that 5,070,000,000 messages had been transmitted and that 80,000 employes and salaried officers of telephone companies were paid $36,000,000 for the year. This includes both the Bell and Independent systems. As a matter of comparison, so as to give you an idea of the stupendous development of the telephone industry, I will state that the telegraph statistics for the same year gives, as belonging to the Western Union system, 1,090,000 miles of wire, an excess for the telephone companies of 3,210,000 miles, and the transmission of telegraph messages as 69,791,000, an excess of messages for the telephone companies of over 5,000,000,000. Of the total number of Independent telephones in the Union, New York state may claim 125,000 to 150,000, operated by about 400 companies that are reported as regularly organized; and numerous exchanges operated by individuals and associations of a few individuals not incorporated bring the number to approximately 500. This shows an increase of seventy-five to 100 companies during the past twelve months.

We certainly have every reason to be encouraged with our progress, in the face of the acknowledged fact that our opponents are stronger financially, and more securely established, and put up a more aggressive contest than in any other section of the country, with the possible exception of New England, where there has been, thus far, little occasion to measure strength and popularity with the Independents. Competition, however, such as we are having is in no way to be dreaded. In fact, it is exactly the incentive that compels the giving of improved service at reasonable prices and is in reality responsible for our rapid progress and success. I doubt if there ever will be telephone monopoly in America again. There may be localities where one company only will operate, but the people have had a good taste of the benefits of competition in service and rates, and you may expect that they will insist upon nothing less than the best in this direction. I believe, in a general way, that the best results can only be produced under the spur of competition.

To dispel any doubt, however, as to the security of the Independents in this competition, I have only to tell you that the average capitalization per subscriber of the combined Bell companies is $417, and the average capitalization of the combined Independents $146. And to emphasize the fact that our calling is an exalted, noble and permanent one, and one destined to be prosperous and of which we should feel proud, I want to quote from a recent number of the *Electrical World:*

"This paper now and what it was thirty years ago is graphically illustrative of the progress made in electrical science and invention. To my mind the greatest invention within or without this span is the telephone. The electric light is a priceless boon, the trolley a great utility, wireless telegraphy a wonderful achievement, but the telephone is all these and a blessed benefaction in human affairs as well. Its sublime simplicity and marvelous adaptability transcend all comparisons in the domain of pure and applied science. The extension of audible speech transmission from a stone's throw to a thousand miles, with a quieter inflection, is a work unrivaled. The world could better afford to go back to the 'penny dip' and the stage coach than give up the telephone. As to what the future holds, no man can say. But even though he explores the ambient clouds on a radium motor with a searchlight for a rudder, the telephone invention will still be secure in its peerless position."

During the year your executive committee has had several sessions, formally and informally. It has been urged that some uniform system of toll rates be adopted, and it also has been suggested that a toll clearing department should be established under the auspices of the state association. It is expected that your committee will make some recommendations on this subject. A year ago amendments to our constitution providing for a reduction in the dues were adopted. It has not resulted in the increase in membership that was anticipated. It is my judgment that dues should be still further reduced to an amount that will assure the securing of every Independent telephone company in the state as members, and, at the same time, provide funds for the necessary expenses of the association. Your committee on amendments I trust will go over this carefully and make such suggestions and recommendations as will meet with your approval. And I urge that each and all of you join the association, if you gain nothing by it but the opportunity of getting together once a year, comparing notes, relating experiences and becoming better acquainted one with another. It will prove a source of encouragement and inspiration for your work, and you will return to it with renewed energy and stronger convictions of success.

President Fuller then called for the report of the secretary-treasurer, T. S. Lane of Buffalo, which was read and approved.

The following committees were approved for the following year by the president: Auditing, law, credentials and nominating.

Many delegates spoke of their experiences in various sections, organizing and installing Independent telephones. Among those who spoke were B. G. Hubbell of Buffalo, J. S. Bailey, Jr., of Utica, F. M. Potter of Syracuse, T. Harvey Ferris of Utica, H. W. Blake of Naples, E. B. Fisher of Grand Rapids, Michigan; A. M. Taylor of Penn Yan.

Charles B. Hill of the Frontier Telephone Company of Buffalo extended an invitation to all the delegates present and their friends to visit the Frontier plant. At 4:30 o'clock the meeting adjourned so that the delegates could inspect the Frontier plant. They were taken all through the place from basement to roof.

A banquet was held by the association at 7 o'clock at the Ellicott Club. This was a complimentary affair, given by the Frontier Telephone Company and the Inter-Ocean Telephone and Telegraph Company and was a sumptuous one in every respect, as the following *menu* will attest:

Little Neck Clams
Sherry
Cream of New Asparagus
Olives Salted Almonds Radishes
Soft Shell Crabs, on Toast, Tyrolienne
Julienne Potatoes
Sauterne
Filet Mignon, Trianon
New Green Peas
Cigarettes
Sorbet Benedictine.
Broiled Philadelphia Squab, on Toast
Lettuce and Tomatoes
G. H. Mumm's Extra Dry
Strawberry Ice Cream
Petit Fours
Cheese
Demi Tasse Cigars

On every table was a telephone, such as is used by the Independent lines. The wires from each telephone ran to the ceiling.

The speakers of the evening sat on a raised platform at the head of the room. The toastmaster, B. G. Hubbell of Buffalo, sat in the middle. On his left sat H. D. Critchfield of Chicago. On his right was George R. Fuller of Rochester. The others at the speakers' table were: E. C. Lufkin, Charles B. Hill, Buffalo; E. B. Fisher, Grand Rapids, Michigan; J. G. Splane, Pittsburg; W. D. Barnard, Philadelphia; J. S. Brailey, Jr., Utica; Frank H. Mott, Jamestown; A. L. Tetu, Louisville, Kentucky; W. L. Cary, Cleveland.

Mr. Hubbell introduced the speakers. The first was J. S. Brailey, Jr. He said that he was interested in several Independent telephone companies in the west and that every one of the companies was doing a successful business. Over $15,000,000 is represented in the properties, he went on, and the dividends had been more than pleasing to the stockholders. The speaker said that the Independent movement originated in the west and gradually spread eastward.

E. B. Fisher of Grand Rapids, Michigan, who is president of the Michigan state organization, told of the beginning of the widespread movement of the Independent lines in Grand Rapids, nine years ago. The farmers in Michigan, he said, are extensively using telephones owing to the cheapness of the Independent telephone service.

W. L. Cary of Cleveland, counsel for several Independent telephone companies throughout Ohio, told of the great growth of the Independent lines in that state.

H. D. Critchfield of Chicago said that the outlook for the Independents in Illinois was more than promising.

Frank H. Mott of Jamestown told of the success of the Independent lines in New York.

J. G. Splane of Pittsburg said that the Independent lines in that city were in the lead and the outlook was very bright.

A. L. Tetu of Louisville, Kentucky, said that the competing lines did not have a show in his state with the Independent lines.

FRIDAY, JUNE 24.

Friday's session began at 10 o'clock a. m. Previous to the opening of the executive session some time was spent in inspecting manufacturers' exhibits, of which there was a goodly number on display in the hotel. The time from 10

o'clock until 12 o'clock was taken up with the election of officers for the next year as follows:

President—H. H. Persons, Buffalo.
First Vice-President—Howard Hendrickson, Albany.
Second Vice-President—Boyd McDowell, Elmira.
Treasurer—T. Harvey Ferris, Utica.
Secretary—T. S. Lane, Buffalo.
Executive Committee—George R. Fuller, Rochester; H. H. Persons, Buffalo; Bert G. Hubbell, Buffalo; Edward Davis, Philadelphia; C. H. Poole, Utica; S. B. Rawson, Elyria; J. S. C. Edwards, Johnstown; J. S. Brailey, Jr., Toledo, Ohio; T. B. Bassilin, Croghan; F. M. Potter, Syracuse; J. F. Stockwell, Oswego.

The following resolution was introduced and adopted:

Resolved, That it is the sense of the New York State Independent Telephone Association that the territorial rights of any and all accredited Independent telephone companies toll lines or exchanges should be scrupulously respected, and that no Independent telephone company shall encroach upon the territorial rights of any Independent telephone company operating an efficient and comprehensive telephone service.

This resolution was unanimously adopted by the Association. It is of special significance, not only to the toll line companies, but to the local exchanges operating in the state of New York. The principle outlined represents the foundation of the entire Independent telephone movement, tending as it does to safeguard the investor and guaranteeing him territorial protection. In other words, it clearly defines the policy of the Independents, which is to carefully refrain from competing with each other. Any attempt on the part of one Independent telephone company to build competing exchanges and toll lines in competition with other Independent telephone companies, thereby depriving them of a portion of their revenue, should be discouraged throughout the entire Independent field, and any company doing this directly or indirectly will be subject to the criticism of Independent telephone interests generally.

The Association adopted the following amendments to the by-laws:

Section 1 of Article 3 of the constitution of the New York State Independent Telephone Association is hereby amended so as to read as follows: Section 1. A. "Any person owning or employed in an official capacity in constructing or operating an Independent telephone exchange or owning stock in any Independent telephone exchange within the state of New York may become an associate member of this Association by making an application to the Secretary of the Association, and upon being approved by the executive committee, shall become a member thereof upon the payment of one year's annual dues, as hereinafter provided. No associate member shall be eligible to an elective office."

An Independent telephone company, herein referred to, is defined as follows: "Any telephone association, partnership, corporation or exchange, which operates at least five telephones and not less than two miles of wire, and which does not use, connect with or interchange business with any apparatus or toll line owned, constructed, manufactured by, leased or operated by the American Telephone and Telegraph Company or the Western Electric Company or by any sub-licensee of the so-called Bell Telephone Company."

Section 2 of Article 3 is hereby amended so as to read as follows: Section 2. "The annual membership dues shall be $1 payable in advance."

Section 1 of Article 4 is hereby amended to read as follows: Section 1. "This Association shall meet annually during the months of May or June at such time and place as may be determined by the executive committee. Notice thereof shall be given to each member by mailing a copy of the call at least fifteen days prior to the date of the meeting."

Section 1 of Article 5 is hereby amended so as to read as follows: Section 1. "The officers of this Association shall be a president, first and second vice-president, secretary and treasurer, and an executive committee to consist of eleven members, one of whom shall be the president. The office of secretary and treasurer may be held by the same person."

Section 1 of Article 7 is hereby amended so as to read as follows: Section 1. "Upon the consideration of any business had at any annual or special meeting of the Association, each member shall be entitled to one vote."

The executive committee recommended the adoption of the special tariff committee's report.

The afternoon session was opened by a highly interesting paper on "Telephone Construction and Its Proper Care," by W. H. Johnston of Buffalo, who said:

In the matter of telephone construction, as in practically everything else with which we deal, foresight is largely hindsight properly applied. Development of the business has rendered one after another of the older methods inadquate and has pointed out the need for the substitution of new schemes in their places. Further than this, I think it has shown us to some extent what to expect and perhaps what to prepare for to meet the requirements of conditions which have not yet actively manifested themselves. Some time ago, the location of a central office building was not a matter of great import and the pole lines that radiated from it were built to bring in the business that presented itself from day to day. At present, the design and development of a telephone plant is of prime importance, and is as great a factor in the efficiency of the investment as economy in pay rolls and in the purchase of materials.

Without worrying you with reminiscent detail, I would like to suggest that the introduction of the common battery or central energy system some ten years ago has done more to crystallize the methods of telephone plant construction and to bring about the high standards that are to-day so generally observed, than any other influence that had previously brought to bear. A local battery system is not a unit in any such sense as the modern common battery telephone plant, because the local battery instruments are only dependent upon the central office for switching, while the common battery instrument is energized by the central office equipment, and is practically a part of the switchboard apparatus. Electrically it makes not a particle of difference whether a given number of miles of line wire connecting two local battery instruments are local lines, or a combination of the local lines and a toll line; but in a common battery system this point is of great moment. While formerly a switchboard and a separate pair of wires, strung haphazard to each telephone instrument, constituted a plant, now each part of the system must bear a particular relation to every other part or the result will not be satisfactory. Like virtue, the common battery is its own reward. The thought and experiment it has involved have developed handsome returns in economy of operation and in efficiency of service. Conduits and cables and good rubber insulation, and not least on the list, that much condemned though worthy art, tree trimming, were all known before the advent of the common battery; but it was the common battery that made their necessity so manifest, and that has developed their use so thoroughly. While the standardization of details of construction is perhaps to be striven after rather than to be confidently expected—because invention and improvement is so much the spirit of the age—I think that the lesson we have been taught in common is that the telephone plant is a case of electrical power transmission in minute quantities, and that the present maximum local line resistance in a twenty-four volt system with ordinary central office apparatus, is from 500 to 800 ohms, first-class service being kept in mind all the time. There is more in this idea than will perhaps seem apparent at first, and its results are of a greater importance in larger centers of population than in small ones. The net economy of operation is a balance between pay roll expenditures and interest on the investment. Bearing the electrical limit I have just referred to in mind, it is obvious that the cost of line construction must be kept at a minimum in order to avoid losing the advantage afforded by a compact single central office system. On the other hand, it is easy to see that it may appear a very handsome economy in plant design, but may prove a very expensive arrangement when operating charges are calculated.

In the first burst of enthusiasm that heralded the new school of telephone construction, I think perhaps some money was wasted in frills and gold plating that reaped no adequate returns for the expense. I am convinced that we have profited by our experience and that the average telephone man has a pretty thoroughly defined idea of what is necessary to insure good, permanent service and how much and what quality of it he needs in the particular case in question. The items of development in recent years which I think are most noteworthy, are the greatly increased use of paper insulated lead-covered cable and the employment of methods of complete underground distribution.

In the days of the local battery, we all understood that our lines must be kept free from grounds, but the absolute necessity of strong, ship-shape work was not clearly demonstrated to us until the new system came into use. We care for our plant systematically nowadays. We watch slack wires, loose corners, leaky cables and districts in which electrolysis makes its appearance as we never did before; we work all night to clear up a case of trouble that a few years ago would have been passed over to the next day's trouble blank, and we inspect instruments, wires, poles and cables so that we may detect and remedy, if possible, incipient defects before they have the opportunity to do harm to the service. It is gratifying to know that the telephone has become such a popular institution, and is so extensively used that methods of construc-

tion and maintenance which would have been prohibitively expensive some years ago, used in their present wholesale ways are actual economies and result in considerably decreased costs in installation and operation per subscriber.

I trust that this convention will prove to be the forerunner of many that will bring us closely together as this one has done, and that our annually renewed acquaintance may prove as great a benefit to the Independent telephone business in general as it has to me individually.

The second paper of the afternoon was on the subject of "Are Present Business Methods Satisfactory?" by E. M. Potter of Syracuse. It was as follows:

To follow a beaten path without thought as to where it leads is a natural trait to mankind. The foolish rambles of a lost calf may in years develop the great highway—where man has trodden others are ever ready to follow. An overwhelming demand by the people and the refusal to grant lower rates by the Bell company, at a period when its monopoly was undermined by patent expiration, gave birth to the opposition telephone movement, which, taking its first nourishment from forms and methods pursued by the Bell company, has followed the calf and the beaten road; deviating occasionally, to its benefit, but still unwilling to adopt methods which have to other public serving enterprises analogous to telephony proven eminently proper, satisfactory and profitable.

The general type of telephone and the general business plan inaugurated by the Bell company have been universally followed to this day. It may be that a movement having its birth but a decade ago can be excused for not putting into existence at once a series of methods far different from those put in vogue by a vast and successful pioneer corporation. But defects in these methods have been made apparent; and it is evident that the future telephone business of any community is to be done by that company which will most satisfactorily cater to the wants of its patrons, and which will take the public into its confidence, and prove that its fundamental business object is to grant to its customers every possible advantage regarding quick service and courteous, fair treatment, and manifest a generous desire to incorporate into its growing business every available benefit of improved apparatus and improved practice. The Independent telephone interest to-day is a giant, with a giant's strength, but there still lies within a far greater and more powerful latent force in its army of active, interested citizens, that is shown by its growth to 3,000,000 telephones. From ocean to ocean, from lakes to gulf, we find few districts that have not brought into existence an association of the most independent, active and progressive minds, furnishing local capital, local directors and a local management, to study and to foster its sturdy growth, to give to its people a satisfactory telephone service, and to the resident of the city and of the country the value of our greatest commercial benefit. The past ten years have been years of instruction to operator and user alike; and the future should transform what to many is now deemed a luxury into a general and absolute necessity. This means the reaching out for such classes as are prevented by contract and cost from assuming the burdens imposed, as well as the placing of such restrictions upon all users alike as shall prevent the present abuse of unlimited service.

The American Bell Company establishing a business practice based upon its strong, arrogant and fortified position, assumed to bind the unfortunate, who, by need, was compelled to pay its exorbitant rate to a long term contract, embodying such clauses as would relieve the company and throw responsibilities upon the subscriber. The early business policy of this company, embittering every section alike, had the effect of bringing down a general desire for retaliation from its users, now in many cases our co-workers in the Independent field. The proof of its error is vividly before all. In its legal and commercial tactics and in patent litigation it has met continuous defeat, leaving the Independents to-day a power, a factor to be reckoned with in the great commercial future of the United States.

The more prominent weaknesses of the early system have been met, and many of its imperfect features improved upon and perfected. But during the struggle the telephone business has changed; conditions have altered. From a luxury enjoyed by the wealthy or the successful business man the telephone assumes such a position to-day that no one will deny that for both business and social advantage to all classes in city and country it is a substantial and positive necessity. Nevertheless with its impressive growth, the telephone is to-day only possessed by a favored few. To this few the general public must go and does go to get the service so necessary and advantageous, but which by prohibitive rates or objectionable methods it is still beyond their means to install. The class thus excluded from service is large and ever will be a heavy service consumer. Can we afford to shut out this class and expect by imposing a tariff upon the few and granting them unrestricted service to counterbalance the direct loss from this element?

In recent articles appearing in the telephone journals the abuses of the selected unlimited service have been pointed out, with illustrations and comparisons drawn from the methods of railway, steamship, express, gas and electric lighting companies, and other public service corporations. To what ebb would the securities of these corporations fall were they to put into effect the present telephone business system? We may not deny the abuse—the Bell company has perceived it for years. That company attacks the fault with a measured limited service. Some of us are attempting to profit by their endeavor to extract themselves from their own snare. The attempt is wrong; it will bring many benefits, but nevertheless, from a business standpoint, it is radically wrong.

The cost, the annoyances and the slackened service due to an attempt to make the operators manual recorders, have brought toll collecting devices into extended service, especially in the larger cities; this method eliminating the greater faults has proven in many respects quite satisfactory. The general commercial business practice of charging the user for the amount of service consumed seems to be right, being as it is satisfactory, just and equitable to both subscriber and company alike. But still the contract, the guarantee, the excessive rates, deny to this plan a complete success.

To secure the greatest amount of money from a given community for a given commodity at a low cost seems to be the ideal business design. The telephone companies have just this chance. Why may it not be practicable to establish a toll service system and place telephones in for any one who is sufficiently able to pay a small guarantee or who is able to secure a guarantor, as demanded by the light and gas companies for meter installation? Let the guarantee be a minimum, as low as practicable; let your service be extensive; make your income a direct product of the service given. The use will grow as people learn its inestimable value; your income will grow with the demand.

Every connection made through your switchboard means a drop in your financial coffers. You believe the practice will call for a deliberate subsiding of your exchange activity. It will, indeed; and you will find immediate relief of operators working under high pressure service. You have eliminated the non-paying element, legitimate service is substituted; and as the cost of operators, exchange operation, depreciation of apparatus, wear and tear upon cords, jacks, etc., is directly proportional to the service, your business, therefore, secures at once large immediate benefits. With a minimum charge the company is guaranteed its fixed charges; with its lower rates it has guaranteed to it a broadened and more extensive telephone plan than is now in existence. It may be expected to broaden the scope and value of the telephone and stimulate its use to such an extent that the revenue derived from a measured service call will far surpass any income secured through the contract system. If it be objected that toll collecting apparatus and service measuring devices for the subscriber or for the exchange have not reached the highest stage of perfection, this is no objection to the system itself. The system once conceded to be correct there is little doubt but that inventive genius will produce the requisite mechanism. Should the plans thus outlined be developed to a complete practical system, we might well hope to see installed throughout the land a telephone system satisfactory, stable and vast in comparison with that in existence to-day. Place such a system and a telephone corporation is in a position where its securities would not be sold on the basis of the number of contracts that it has been able to bind its citizens to and the term period for which these contracts have been taken, but these securities would be sold upon the basis of the population and the character of the community. The investor would know at once that a certain city would produce a certain amount of good telephone business; he would know that if the property is properly built and operated under good management he would receive remunerative returns. He would gauge the telephone business as he does that of the gas, the electric light or the trolly. Telephone bonds and stocks would have a just valuation placed upon them. And thus under more stable conditions and consequent stimulated investment, future telephone business and securities would leap by strides and bounds to a position second in standing to none in the commercial world.

T. S. Lane of Buffalo read a paper on "Methods of Handling Toll Business." He said:

In offering the suggestions which I have to make relative to the handling of toll business, it is not my purpose to recommend an original plan for the conduct of the business nor to lodge a general complaint against methods now in vogue, but rather to emphasize certain methods and regulations which the experiences of various operating companies have demonstrated to be good, and the general effect of which I have had an opportunity to observe.

Any system for the handling of tolls must take into consideration, among other things, compensations of station originating business, the establishment of uniform rates, routings, division of mileage among different companies, method of settlement and a multitude of minor details. It is self evident that such a system must possess three qualifications, namely: it must be elastic, simple and equitable. By elastic I mean that the system must be one which will readily adapt itself to any given territory, any combination of toll lines and exchanges, one which will not be interferred with by special routings or by other conditions peculiar to some particular locality; in other words, the method must be sufficiently elastic to provide means to properly account for and handle a toll message from any

point in New York state to any other point in New York state and by the same means must take care of business between points in New York state and points in other states, and this must be accomplished without departing from the general policy of the system adopted.

As to the second qualification, a system to be simple must be one which can be easily understood by the manager of any exchange or any toll line company whose business is settled in accordance with its provisions and must be free from unnecessary detail. The charges and credits for each company must be easily understood and so made that each company receiving a statement may readily check the statement; the mileage division must be so plain that any one with a standard map can be assured of the accuracy of the statement rendered or can detect errors if errors exist. In brief, a simple system is one which accomplishes a maximum of results with a minimum of labor.

Any successful system covering division of toll revenue must provide for a fair and equitable distribution of revenue, not only between connecting toll line companies, but between the toll line company and exchanges with which it connects. A system designed for the particular benefit of the toll line companies has a tendency to reduce interest in the development in this important branch of the business by the exchange and leaves small inducement for the local companies to provide prompt and efficient toll line service. On the other hand, a division of revenue which is unprofitable for the toll line company gives no incentive to the toll line company to extend and perfect its system. Our local exchange companies and our toll line companies are mutually dependable each upon the other for existence. The exchange must have the toll line business to meet the demands of its patrons, and this is true to-day to a greater extent than ever before. The toll line company must have the local exchange to produce the business which it handles, all of which goes to demonstrate the necessity for an equitable plan of toll revenue division.

Following these general qualifications are a number of specific problems which must be considered and definitely decided upon, namely: rates, mileage, time limit of messages, night rates, method of dividing revenue between connecting toll line companies, method of tariff division between groups of companies, method of reporting toll business, method of transmitting toll messages, franked business, accounting, forms to be used, etc. In arriving at a uniform and equitable schedule of tariff rates, many of the larger toll line companies have found the so called block system of great assistance. The application of the block system is as follows: A map of the territory to be covered is subdivided into squares of five or ten miles and each square numbered. This gives every station and exchange in the entire territory a block number, whether station is connected or not. As the mileage between any two given points must determine the toll rate between said points, an easy way of arriving at the mileage is to consider the air-line mileage between any two given stations as being the distance represented by the air-line mileage between the centers of the respective blocks in which said stations are located. In this way the air-line mileage between the center of each block to the center of all other blocks is ascertained at the start, and, having determined upon the rate per air-line mile, which is to govern the tariff, the rate between any station and all other points covered by the block system is immediately ascertained by referring to the rate governing the block in which the station is located. As soon as a new station is connected, it is only necessary to notify all other stations of the connection, together with the number of the block, and all stations by this means are informed as to the rate to the new connection.

I assume that the advisability of determining rates by the old method formerly used by the Bell company, based on pole line mileage, is so obsolete as to call for no discussion as to its advisability when applied to a general system of handling toll business. Without competition, the plan of basing rates on pole line mileage is doubtless practicable, but with two competing interests operating in any field, an attempt to meet competition and base rates on pole line mileage would result in a schedule of rates which would be unsatisfactory to the public and which would not represent intelligent competition. Between two points, one company might have a pole line mileage of 200 miles and a competing company a pole line of only 100 miles. The company basing its rates on the air-line distance would be more liable to be right from a competitive point of view than would the company adopting pole line mileage. On extremely long hauls between large centers—for instance, between Buffalo and Philadelphia—it might be advisable to modify the air-line mileage basis on account of extraordinary pole-line mileage as compared with the air-line mileage, and, in fact, any rates based on the above mentioned plan can be easily regulated by issuing special rates to meet extraordinary conditions.

As to the amount of tariff to be charged per air-line mile there is a wide difference of opinion. Some operating companies claim that a revenue of one-half cent per mile leaves a margin of profit. Others advocate a minimum charge of six-tenths cents per mile. In my opinion, a schedule of tariff rates, based on air-line mileage, should conform as far as possible to a charge of two-thirds cents per air-line mileage with a minimum of six-tenths of a cent per mile. I also believe that no rate should be made of less than ten cents between any two toll points.

The question of time limit for toll messages is one which merits careful consideration. The Bell companies long ago discarded the five minute rate and many of them are to-day making a very low rate for a one minute service. The making of five minute rates by the Independent companies seems to have been almost universal at the start, the theory being that the Independent companies in offering a five minute rate at the price their competitors were charging for three minutes' service would be a great argument in favor of Independent toll line service as against other toll line service. I believe, however, that this theory is all wrong for the following reasons:

The great majority of toll users are business men who regard promptness as an essential feature of good toll service, and especially valuable. In the majority of cases the business man can complete his conversation in three minutes if he knows that three minutes is the limit, and he would rather reach his party quickly on a three minute basis than to have the privilege of talking five minutes and experience long delays in getting connections.

In meeting competition our toll line service is considered chiefly from two points of view, promptness and clear transmission, and of the two I think prompt service counts for more, if anything, than the other, although both are essential. In the keen competition now under way between the two opposing telephone interests I have observed that the toll line company which handles calls without delay will have all the business that it can handle. In brief, the toll user prefers a three minute service which he gets to a five minute service for which he waits. It has been argued that "the five minute time limit is good advertising for the Independent company and that the toll user does not consume any more time than if limited to three minutes." This I believe to be false reasoning. If the advertisement does not make a sufficient impression on the toll user to cause him to make use of his full time limit, it has no value from an advertising point of view, and, on the other hand, I have frequently observed toll users time their conversations and make use of the extra two minutes simply because it cost nothing, thereby unnecessarily blocking the service.

The toll situation of the Independent companies to-day is as follows: The toll lines of every Independent company with which I am familiar are crowded to their utmost capacity, and so rapid is the increase of business that, although hundreds of workmen are employed in installing additional toll circuits in all parts of New York state, the increase in business is constantly ahead of the capacity, and it is only by carefully watching operating conditions and keeping down time limit on messages that our toll line companies can hope to take care of the vast volume of business which is being given to them. Under present operating conditions, a line between two stations working on a three minute schedule should be able to handle not less than sixty messages daily. I am informed that in localities where the five minute rate is in force the number of messages handled daily when the lines are worked to their utmost capacity is scarcely more than half of this number. In many exchanges in western New York the original limit on toll messages was five minutes, and although the change was made to three minutes with considerable doubt as to the result, the complaints against this change have been as few as to scarcely warrant attention, and I do not believe that any company which has adopted the three minute schedule will advocate a return to the five minute schedule.

Experience has demonstrated that less than twenty-five per cent of the calls made under the three minute limit plan use overtime. For instance, during the month of April one exchange originated 3,663 messages and received 4,488, a total of 8,151 messages, and out of these calls only 306 messages were overtime messages. I am entirely in favor of a three minute schedule and trust that our various operating companies in New York state may see their way clear to universally adopt same. I might mention in this connection that the Union Telephone and Telegraph Company, operating in western Pennsylvania, and the United States Telephone Company, operating in Ohio, have successfully used the three minute schedule for some years and express themselves as satisfied with the results.

I am in favor of the adoption of a uniform scale of reduced night rates to apply between the hours of 6 p. m. and 6 a. m., at which times our toll lines will be comparatively idle unless an inducement is made to use the service during this period of the day. I think that a reduction in rates exceeding twenty-five cents can be made to profitable advantage, the minimum reduction being fifty per cent. No night rate on messages exceeding twenty-five cents to be less than twenty-five cents.

A simple and easily understood method of dividing revenue between connecting toll line companies and one which is used quite extensively by operating companies is as follows: Deduct from the total revenue represented by interchanged business the originating commissions due each company, the remainder of the toll tariff to be divided between the connecting companies in proportion to the ratio existing between the air-line distance from point of origin to point of transfer and the air-line distance from point of transfer to the point of destination. For example, let "A" represent a toll station on one company's lines, "C" a toll station on another company's

lines, and "B" the meeting point of the lines of the two companies. Suppose that the air-line distance from "A" to "B" is twenty miles and the air-line distance from "B" to "C" ten, the total mileage represented by the line from "A" to "C" 100. The total mileage represented by the line from "A" to "B" will then be 100 times twenty miles, or 2,000 miles. The total mileage represented between "B" and "C" will be 100 times ten miles, or 1,000 miles. The total mileage of the two companies for business between "A" and "C" will be 3,000 miles. If the rate between "A" and "C" is thirty cents, the toll revenue represented will be 100 times thirty cents, or $30. If each company deducts twenty-five per cent for originating the business, there will remain $22.50 toll tariff subject to mileage division, and of this two-thirds should go to the credit of the company owning the line from "A" to "B," and one-third to the company owning the line from "B" to "C." Following out this plan of mileage calculation, the credit for each company on a month's business between all stations on one company's line and all stations on the other company's lines can be included in one general settlement and the exact amount due each company on mileage easily ascertained. In arriving at mileage settlements between connecting toll line companies, each company should assume the mileage of its subsidiary connections and should make a division of its share of the new revenue with such connections.

In reference to the division of tariff between toll line companies and exchanges having no toll line mileage, it must be borne in mind that the toll line companies have their entire investment tied up in a system from which their sole revenue is toll business, and although exchanges at the termini of the toll line may represent a much larger investment than is represented by the toll line, the investment in the exchange depends only in a small measure on the toll line business which is handled by the exchange with very little additional investment. For instance, a toll message transmitted between two exchanges of 1,000 subscribers each, over a toll line having two circuits, involves the actual use for the time being of only one-thousandth part of the investment in the exchange, but at the same time ties up one-half of the entire toll line system.

I think there is no dispute as to the fairness of basing commissions paid to exchanges entirely on originating business for the reason that a large part of the expense incurred by the exchange in handling toll business arises from the necessity of making collections, and it seems reasonable that the exchange which assumes this part of the transaction should be entitled to a greater compensation than the exchange which merely delivers the message.

In making charges against and giving credits to various companies dividing toll revenue, I find the following method, which is used extensively, adaptable to nearly all cases: Charge each company with "tolls sent paid," "tolls received collect" and "messenger fees collected." Give each company credit for "messenger fees paid," "commission on originating business" and "mileage" (as shown by mileage statement). To get this information it is, of course, necessary for each company originating business to make a careful record of the business transacted with each station as follows: "Number of messages sent," "number of messages received," "overtime," "amount of tolls sent paid," "amount of tolls sent collect," "messenger fees collected," "tolls received paid," "tolls received collect," "messenger fees paid." So called "deadhead messages" should be entirely eliminated and operators required to make a charge ticket for all messages no matter by whom sent nor for what purpose. A record can be made of company business subject to frank, and an adjustment of same made between companies interchanging business. Some contracts between large toll line companies specifically set forth that neither company shall carry free business for the other

In many localities a limited territory is covered by a series of short connecting toll lines, each line owned separately and under separate management, and the division of joint revenue between such lines presents a problem more complicated than the division between large toll systems. In some instances this problem has been solved by local joint traffic associations. The membership of the associations is composed of representatives of each of the connecting companies, the plan of revenue division being similar to that outlined in the present discussion. I believe the forming of local associations should receive careful consideration and should be encouraged all over the state.

In Chautauqua county are nine short toll lines extending from Jamestown via Sherman and Mayville to Westfield, and thence east and west from Westfield along the lake shore. Some time since these companies formed a traffic association for the purpose of establishing uniform rates and adopting a system for handling the business interchanged among themselves as well as business to points outside of their district. This association, known as the Independent Telephone Clearing Association, with its office at Sherman, receive a monthly report of the business transacted from each of the companies making up the membership of the association. The association employs a secretary, who makes a division of the revenue from the reports received, rendering each company a statement of its charges and credits. Remittances are made direct to the association secretary, who in turn makes remittances to those who have balances due them. The secretary's compensation is based on a certain amount for each message handled by him in the work of clearing the entire business, an amount being fixed at something like one-half cent per message.

The method of dividing revenue derived from business going to points on other lines outside of the association lines is as follows: The association lines connect with the line of the Inter-Ocean Telephone and Telegraph Company at Jamestown and with the Union Telephone and Telegraph Company at Corry, Pennsylvania. Each of these toll line companies renders a monthly statement to the association treating the entire group of lines as one toll line company. If the association has a balance due it from toll line companies, it goes into the association fund for general distribution and is disbursed among association members according to mileage furnished by each.

The local association has a great advantage in being able to come in close contact with its members and to know thoroughly the territory which is covered. Switching fees are entirely eliminated. In our interchange of toll business throughout the state I would strongly recommend that switching fees be entirely done away with, as their general adoption would act as a great handicap to the successful conduct of the toll business and would give competing interests a great advantage over the Independent toll line systems. There has been some discussion throughout the state relative to the formation of a state traffic association for the purpose of clearing interchanged business between the larger toll line companies. I find on investigation that this class of business represents, at the present time, a comparatively small amount, and I believe that we are not quite ready for an association of this kind, for the reason that the revenue represented by this class of business is not sufficient to warrant the expense necessary to maintain and conduct such an association.

So far as western New York is concerned, the toll line companies are having no difficulty in arriving at a division of revenue at a very small expense, in fact, at a cost of less than 2 per cent of the gross business cleared. The real need is for a method of making a fair division in localities covered by short lines interchanging a large volume of business, and as I stated before, if these different localities can be formed into associations, organized on similar plans and using similar methods, the results will be satisfactory throughout the state, and from these smaller associations, we will gradually work into one joint traffic association in which the missionary work will have been accomplished. No manager of a state traffic association could at the present time be familiar with the conditions in all localities covered by short connecting lines, and the serious complications which arise in establishing rates, regulation and routings come from just such localities.

A still better plan for bringing about a uniform toll service would be a concentration of short lines under one management, for instance, in certain counties in which a dozen or more separately controlled lines are interchanging business, an association or even a corporation could be formed from among the various connecting companies, which could lease all of the connecting lines and operate them as one line, alloting to each company a division of the net revenue in proportion to the pole line mileage furnished.

"Unity of control" is a phrase which may not appeal particularly to a gathering of Independent association men, but at the same time the more we can intelligently concentrate "control of operation" of our toll lines, the nearer we come to perfection in uniform and efficient toll service.

President George R. Fuller of Rochester gave a most instructive talk on "Methods of Exchange Accounting." His paper showed careful preparation and was warmly received.

The last paper of the afternoon was on "Telephone Conditions in Great Britain and Continental Europe," by M. S. Conner of Rochester. In full it was as follows:

The telephone situation outside of the United States presents many features worthy of consideration. The majority of them, it is true, are of value only as object lessons which serve to strengthen our faith in American practice and thus prevent us from trying experiments that would, in a great many cases, result disastrously, either from a financial or a service point of view. On the other hand, there has been considerable work done on the other side that is commendable, to say the least, and would well be worth careful study with a view to improving our systems here. My experience in the telephone field abroad has hardly been extensive enough to draw any general conclusions that could be considered of great value, but I will try to make a few plain statements of things that I have seen, hoping that they will at least prove interesting to some of you.

Naturally, when we cross the Atlantic we reach England first. There we find the control of the telephone business vested by law in the hands of the general postoffice. When the telephone appeared on the scene the postoffice officials were either wise enough or cowards enough to farm out its exploitation. As a result the Kingdom was divided among several operating companies which were entirely independent from each other. After a few years

the postoffice assumed control of the long distance lines and the several operating companies were consolidated into the National Telephone Company (Ltd.). This company was given a new charter which expires in 1911, and there is a great deal of agitation in Great Britain now as to what turn telephone affairs will take after that date. The English people entertain a feeling for the National Telephone Company which is very similar to that toward the Bell interests in this country. There is very little doubt that this feeling has been merited, but the National Telephone Company has some excuse for its arbitrary actions in some matters, as it knows that its lease of business existence has only a short time to run and it cannot tell what the future has in store for it, so they have evidently decided to "make hay while the sun shines."

The postoffice has now entered the operating field in earnest in London and has several central energy exchanges in operation at present. It is working in harmony with the National Telephone Company, charging the same rates and trunking between the two systems. It may be interesting to note that in England a trunk line is called a junction line and a toll line is called a trunk line. The entering of the operating field by the postoffice authorities is taken by a great many to mean that they contemplate purchasing the business of the National Telephone Company on or before the expiration of their charter and that they are now principally interested in seeing that the telephone material installed will be of use to them in the future, and in getting sufficient experience to enable them to handle the business.

The career of the National Telephone Company has been filled with many hardships, as it has had to contend with extraordinarily harsh treatment by various municipalities. It has never been able to get any street rights in London and, as a result, it owns no underground cables; all of their wires being run overhead with the exception of the wires they rent from the postoffice. Their overhead wires are mounted on horses which are fastened to the tops of buildings, they having to make a contract with each householder allowing the passage of the wires over his premises. It has happened a great many times that it has been necessary for them to move an entire run of wires merely to satisfy the whim of some land owner, who refused to have them pass over his property any longer.

From an engineering standpoint a great many of the systems and exchanges that have been installed by the National Telephone Company in the past have not only been freaks, but have been schemes that have been thoroughly tried in this country and were known by all American telephone engineers to have been failures. Under such a head might be mentioned flat switchboards, call wire systems and ringing through systems. It was only two years ago that a large switchboard was installed in Edinburg by the National Telephone Company on the ringing through system. I have been informed recently that this switchboard has been converted into a straight central energy one.

The work that the British postoffice is doing in London leaves very little to be desired. From a switchboard and operating point of view they have copied, to a great extent, from the New York Telephone Company. Their underground system and cable distribution is very similar and might be said to be a copy of that in Paris. It is a very strange condition in England that practically all of the telephone material is imported. The majority of the telephone apparatus used is manufactured by the Western Electric Company either in this country or in their Antwerp factory, although various other European factories get a considerable amount of the business. This is probably the direct result of the backwardness of telephone progress and the practical monopoly which has been maintained in the operating field by the National Telephone Company.

There has been a considerable movement in various parts of Great Britain along the line of municipal telephony. We can readily compare this movement with the Independent work in this country, as it was the result of the abuse of a position attained by exploiting a public utility under the protection of patents. The installations that, so far, have been put up by municipal governments in Great Britain have been antiquated equipments, which was probably due to the fact that they were laid out by engineers who had not been in touch with telephone progress for several years, and manufactured by companies having no experience in large switchboard construction. This is greatly to be deplored, as it has had the effect of preventing, to a considerable extent, the expansion of the telephone business in Great Britain. If the people who became interested in this movement had taken the trouble to have carefully studied the conditions elsewhere and to have gotten the very best obtainable apparatus at any cost, the results of their enterprise would undoubtedly have been different and there would be a great many more telephones in the United Kingdom to-day than there are.

As we cross over to the continent we leave behind us every vestige of private monopoly in the telephone business. Practically all of the telephone systems of any importance on the continent of Europe are under government control. This is particularly true in France, Germany and Belgium. We find there well organized departments, but very little attempt is made to satisfy the customer with any kind of service. Here the telephone is not a business, but merely the means of maintaining a lot of people at the government's expense. The subscriber has no choice of service that he may subscribe to, but he must take a regular telephone at a regular price or not have any. If he has the misfortune to get into a disagreement with his operator, who usually is a relative or friend of a politician, he is very liable to have his telephone removed and not be able to get one again for a considerable length of time. Telephone apparatus is kept in service as long as it is possible to use it and all improvements are considered from a theoretical point of view rather than an economical one. In fact, the cost of operating and maintenance is very seldom considered.

When the large central energy exchange was installed in Brussels it was feared by the government officials that they would have some difficulty in finding work for all of their operators on the new switchboard. The result was that the switchboard could not be operated in the most efficient way. The minister of post and telegraph in France, when confronted with the fact that a central energy switchboard would save from thirty to forty per cent of the operating expenses, made the remark "that it did not make any difference; when the amount required for operating expenses had been written in the bill of appropriations that was the end of it." It is thus very evident that we can expect to get very little information that will have a tendency to further the advancement of the telephone industry from an operating or business point of view in the continent of Europe. On the other hand we cannot help but admire some of the substantial construction work that they have carried out. It has been a considerable number of years now since the underground system of Paris was installed. Within the walls of the city of Paris there are no telephone wires. A single pair lead-covered cable goes to each subscriber's instrument.

The three largest telephone exchanges are located in the same building on the Rue Gutenberg, near the city hall. At the time I made a tour of the underground system over 15,000 pairs of wires were brought into the basement of this building and terminated on the same distributing frame. The cables were all 200-pair and were laid loosely in a large box which ran alongside of the city sewers. At various intervals some of these cables were run into distributing rooms which were built underground and there were divided up into smaller sizes by means of filled cable heads. These cables were then divided up into 7-5-3 and 1-pair cables with pothead connections. A very unique system for keeping the cables dry and treating them in case they should become damp from an accidental puncture consisted of a dry air plant in the exchange basement. A pump driven by an electric motor drew air through a large series of desiccators and forced it out into a system of piping. A connection from an air pipe was made with each cable through a small valve. At the opposite end of the cable in the distributing room was a small valve that could be opened. When this valve was opened and the valve in the exchange turned on dry air was forced through the cable, absorbing any moisture that might be contained therein. Lead pipes for air were run to each of the distributing rooms and arrangements were made for connecting the air to any of the small cables by means of a union coupling. This system of complete underground wiring has been practically adopted by the postoffice in London, and the cable drying system seems to be considered by most European telephone engineers as a desirable auxiliary feature to any underground plant.

The city of Brussels is wired in a decidedly American fashion—cables running from the exchange through tile conduits to terminal boxes on poles and wires being led from there to the subscriber's premises. A notable feature, however, is that the poles are made of structural iron, decidedly handsome in appearance and will probably endure for all time to come.

The majority of the cities of Europe are still operating with grounded line switchboards and complete overhead construction. We cannot help but admire the number of years that they use a switchboard and some of their overhead wires with their long spans of a thousand feet or more from one high pole to another is very pretty, indeed, but the construction would hardly stand an American sleet storm, and I do not believe that the service rendered would be at all satisfactory to American business men; particularly if it were subjected to the usual amount of induction from street car and lighting circuits. They are not very much bothered, however, in this respect over there, as the street car lines are not very numerous and electric light wires are underground and the telephone poles are from seventy-five to 100 feet high.

Probably the greatest reason that the telephone systems of Europe are so far behind the times, from an apparatus point of view, is due to the fact that they have not been able to see any economy in throwing away their old material and buying new. However, inasmuch as a great many of the cities have entirely outgrown their present switchboard capacities, they are slowly reconstructing their systems. In doing so we note that they are getting to be very careful in their investigations of what is being done in other places; they study all the available systems carefully, and almost invariably lay out their plans along the latest approved lines and buy nothing but the very best apparatus obtainable. I am sure that this is a procedure that Independent

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telephone operating companies should be more eager to follow than they have in the past. The few extra dollars that it costs to buy the best is of very little importance when compared with the excellence of the service obtained therefrom and the low cost of maintenance. Although we will probably not live to see the enormous growth in the telephone field in Great Britain or on the continent of Europe that we shall experience in this country, we can expect to see model plants, from an engineering point of view, with the very best material and outside construction, thoroughly fireproof substantial buildings, efficient protective apparatus, and switchboards and telephones carefully designed in every detail, with the view to long life and the very best performance of their various functions. It has been customary in the past to say that the life of a switchboard was eight or ten years. These remarks were made from the fact that very few switchboards were ever left in service for any greater length of time. It has very seldom happened in the past that switchboards were replaced because the parts had actually worn out Either it was desirable to make a change, from the point of economy the switchboard never having been efficient, or else the capacity of the cables was too small to accommodate the number of subscribers. I have never seen the parts of a switchboard, such as keys and spring jacks, that showed enough of wear to warrant their being thrown away. At present with the central energy double supervisory automatic signaling switchboard, we have everything that we can imagine would lend itself to quick and economical rendering of telephone service. With the careful designing of the switchboard parts, constructing various pieces of the proper materials, I do not see why a multiple switchboard installed to-day should not be in successful operation twenty years hence, and I predict that we will see very, very few radical improvements in that length of time. It would, therefore, seem that inasmuch as supplying telephone service to the public has gotten down to the point where the returns on the investment are only a fair earning, that it is necessary to secure the capital by investing it in the very best of construction material, buildings and telephone apparatus that it is possible to get.

It is my opinion that a study of European telephone conditions naturally leads us to this conclusion, and if it is so it is probably time well spent.

Among those present at the convention were the following:

M. F. Babcock, New York City, American Electrical Works.
Samuel B. Rawson, Albany, Independent Union Telephone Company, Niagara Falls Home Telephone Company, Dunkirk Home Telephone Company, Middleport Home Telephone Company, Medina Home Telephone Company, Batavia Home Telephone Company, Warsaw Home Telephone Company, Seneca Falls Home Telephone Company, Waterloo Home Telephone Company, Schenectady Home Telephone Company, Albany Home Telephone Company, Cohoes and Waterford Home Telephone Company, Kingston Home Telephone Company, Coxsackie Home Telephone Company, Catskill Home Telephone Company, Tonawanda Home Telephone Company.
F. Harvey Ferris, Utica, Utica Home Telephone Company, Richfield Springs Telephone Company, Cooperstown Telephone Company, Otsego Telephone and Toll Line Company, Otsego Home Telephone Company, Springdale Telephone Company.
F. M. Potter, Jr., George H. Bond, J. J. Jermyn, Syracuse, Syracuse Telephone Company, Columbia L. D. Telephone Company.
J. F. Stockwell, Oswego, Ontario Telephone Company.
George R. Fuller, Rochester, Rochester Telephone Company; Canandaigua, Interlake Telephone Company.
F. S. Bronson, Genoa, Genoa Telephone Company.
J. S. G. Edwards, Johnstown and Gloversville, Glen Telephone Company.
Edward Davis, Troy, Commercial Union Telephone Company.
W. J. Watson, New York City, American Electrical Works.
E. B. Fisher, Grand Rapids, Mich., Citizens' Telephone Company.
Theo. B. Barcelin, J. J. Denison, Mgr., John H. Wood, Black River Telephone Company.
George McClumpha, M. Van Buren, Mgr., Amsterdam, Amsterdam Automatic Telephone Company.
Benjamin J. Haight, New Berlin, New Berlin Telephone Company.
W. L. Cary, Jr., Cleveland, Ohio, Federal Telephone Company.
M. B. Overly, Cleveland, Ohio, United States Telephone Company.
L. B. Eaton, LeRoy, LeRoy Telephone Company.
John Jalby, Buffalo.
Rollin Dow, E. Randolph.
A. J. Tetu, Louisville, Kentucky, Louisville Home Telephone Company.
W. H. Kelley, Newark, Newark Telephone Exchange.
D. Odell, Rome, Rome Home Telephone Company.
Ed. J. Mock, Chicago, Telephony Publishing Company.
S. C. Platt, New York City, Sterling Electric Company.
Oliver S. Titus, Shortsville, Red Jacket Telephone Company.
C. S. Osgood, Manchester, Red Jacket Telephone Company.
George A. Lee, J. M. Brown, L. J. Hill, M. M. McCrillis, James J. Clark, Holly.
F. A. Winne, Brockport, Brockport Telephone Company.
W. E. Eagleton, New York City.
O. T. Wilson, Arcade, Wyoming and Catt Telephone Company.
James Russell, Erie, Pa., Union Telephone and Toll Company.
E. J. Newton, McIntosh Home Telephone Company.
Edward W. Scowden, Brewsburg, Home Telephone Company.
William T. Farrell, J. P. Haley, Rochester Telephone Company.
Bert F. Seiler, Rochester.
Charles H. Bissell, Rochester.
James W. Barry, Rochester.
Charles G. Vickery, Rochester, N. Y.
G. W. Swan, J. A. Roebling's Sons Company.
H. H. Mills, Syracuse.
H. P. Kimball, New York City, Standard Underground Cable Company.
W. E. Eagleton, New York City, American Steel and Wire Company.
H. C. Norton, Byron.
H. W. Gaul, Buffalo.
C. M. Briggs, East Aurora, Haines Telephone Company.
C. D. Warner, Watertown, Citizens' Telephone Company.
W. P. Billings, People's Telephone Company.
H. B. Schoolen, Wilkesbarre, Pa.
H. Wheeler, Buffalo.
M. J. Murphy, Geneseo.
J. H. Griswold, Independent Union Telephone Company.
A. H. Appleby, Watts Flats, Ashville and Panama Telephone and Telegraph Company.
E. G. Deitrich, Cattaraugus, Pioneer Telephone Company.
C. S. Lane, Friendship, Friendship Telephone Company.
A. R. Stone, Meadville, Pa., Meadville Telephone Company.
Howard Hendrickson, Albany, Albany Home Telephone Company.
Samuel M. Strong, Schenectady, Schenectady Home Telephone Company.
George G. Hakes, Little Falls, Interstate Telephone Company.
James Fagin, Herkimer, County Telephone Company.
O. L. Ingalls, Westfield, N. Y., Westfield Telephone Company.
Herbert J. Stevens, Corfu, Corfu Telephone Company.
H. W. Blake, Naples, People's Telephone Company.
Mortimer C. Drake, Kingston, Citizens' Standard Telephone Company.
George G. Otis, Newburgh, Colonial Telephone Company.
D. A. Palmerton, Eden, Eden Telephone Company.
J. S. Gibson, Rochester, Stromberg-Carlson Telephone Manufacturing Company.
George W. Appleby, Harmony, Allegheny and Pittsburg Telephone and Telegraph Company.
J. B. Ware, Grand Rapids, Michigan, Citizens' Telephone Company.
M. S. Powell, Clinton, Clinton Home Telephone Company.
W. L. Misner, Rochester, Inter Ocean Telephone and Telegraph Company.
H. M. Bennett, Hornellsville.
Frank K. Cook, Geneseo.
William L. S. Olmsted, Geneseo.
V. A. Kent, Westfield, Westfield Telephone Company.
E. C. Aiken, Auburn, Auburn Telephone Company.
C. G. Mead, E. J. Helmick, Cherry Creek, Conewango Valley Telephone Company.

EXHIBITORS.

Century Telephone Construction Company, Buffalo—complete line of switchboards and telephones.

North Electric Company, Cleveland—complete line of switchboards and telephones.

Stromberg-Carlson Telephone Manufacturing Company, Rochester and Chicago—complete line of switchboards and telephones, cables and supplies.

F. Bissel Company, Toledo—display of "Ready" specialties, insulated wire and supplies.

Miller Anchor Company, Norwalk—the Miller guy anchor.

Sterling Electric Company, Lafayette—Sterling apparatus.

The Joplin (Mo.) *News-Herald,* in a recent special edition, in which is reviewed the growth and progress of Joplin, says of the Home Telephone Company: "In no city on this continent is there a better system maintained than here in Joplin, where the Home Telephone Company has made itself so useful to the people that it would be almost impossible to get along without it. * * * There is no company operating in any line in the city to-day that has been so completely and thoroughly successful in all its undertakings. Recently it has connected with the Kinloch system and is now giving its customers an excellent long-distance service."

PERSONAL

C. L. Merrick is installing a telephone system at Napoleon, North Dakota.

R. P. Dodge, manager of the local telephone exchange at Tallmadge, Ohio, is dead.

J. F. Mager and W. J. Camden will install a telephone exchange at Walhalla, North Dakota.

Isaac Rising is president of a new telephone company which has been organized at Bath, N. Y.

Thomas Jeffries is installing a new switchboard for the Kenwood (Mo.) Telephone Company.

D. W. Johnson and Chas. Currie will construct a telephone line extending out from Garrison, Kansas.

Dr. Frank L. Young and others are organizing a new telephone company at Newman Grove, Nebraska.

John Sprague of New Hartford, Iowa, is constructing a line to Dike, where he will install an exchange.

Supervisor M. C. Edwards has organized a farmers' mutual telephone company at Waukegan, Illinois.

Henry Rust has sold his interest in the Brownstown (Ind.) Telephone Company to Will H. McPherson.

Robert Sitz of Peterson, Iowa, contemplates constructing two rural lines out from Peterson in the near future.

Charles Kyte, Z. Boswell, J. N. Dalby and others have organized a new telephone company at Madison, Ind.

J. O. Spotts has succeeded W. Smith as division manager for the United Telephone Company at Pottsville, Pa.

J. B. Ware of Grand Rapids, Michigan, is now special representative of the Automatic Electric Company of Chicago.

J. C. Brayton, J. J. Sherer and others are at the head of a new Independent telephone company at Plymouth, Michigan.

S. A. Bush and others are at the head of a company which is planning to construct a telephone system at Inman, Kansas.

A. B. Ammerman of Kirksville and I. J. Bitler of LaPlata, Missouri, have purchased the Lawson (Mo.) Telephone Company.

W. S. Vivian has taken charge of the state traffic management of the Independent Telphone Company at Grand Rapids, Michigan.

C. J. Rath is now general assistant for the Citizens' Telephone Company at Traverse City, Michigan, succeeding Louis Beebe.

Joe Gilmer of Kenwood, Missouri, has purchased the telephone exchange at Hurdland, Missouri, and has taken possession of the same.

A. L. Hill, formerly manager of the telephone company at Smithfield, Texas, will install a telephone system at Honey Grove, Texas.

C. E. Knight has been granted a telephone franchise at Stevens Point, Wisconsin, and will organize a company to install a plant at once.

W. L. Van Camp, manager of the Northwestern Company at Austin, Minnesota, was married recently to Miss Kathryn D. Mayer.

E. C. Warner has been appointed superintendent of the Kentucky division of the Gainesboro Telephone Company, at Glascow, Kentucky.

Clyde Dunseth of Chicago has been appointed manager of the Home Telephone Company of Deadwood, South Dakota, succeeding Frank Cook.

E. P. Wilbur, former manager of the Melford, Mass., telephone exchange, has been promoted to the managership of the exchange at South Framingham.

J. F. Slinkard has resigned as manager of the Green County (Ind.) Telephone Company and Earl Talbott of Linton has been selected to succeed him.

E. H. Martin has been appointed secretary and general manager of the Enterprise Telephone Company of New Holland, Pa., vice William F. Stauffer, resigned.

L. W. Burch, president of the Electrical Supply Company, and others are the promoters of the Independent Telephone Manufacturing Company at Madison, Wis.

C. S. Platt has been appointed eastern representative of the Sterling Electric Company of Lafayette, Indiana, with headquarters at 346 Broadway, New York city.

T. H. Deakin and P. Johnson have resigned their positions with the Port Chester branch of the New York Telephone Company, and have gone to Denver, Colorado, with the Independent company there.

Dr. J. C. Shelton of New Hartford, Missouri, is interested in the construction of a metallic line from New Hartford to connect with the Buffum Telephone System.

John Hansen, who recently purchased the Davenport, Washington, exchange of the Inland Telephone Company, is negotiating for the purchase of the Rearden exchange.

C. E. Gibbon, a broker, has purchased the Island Telephone Company at Charleston, S. C., formerly operated in connection with the Gordon telephone system, for $8,200.

Miss Alta Guffey, formerly a "hello girl" with the Independent Telephone Company at Atchison, Kan., was married on June 3 to George Wolf at her home in Union, Mo.

C. M. Kopp, C. F. Buchanan and George H. Reis have been granted a franchise by the city council of Shakopee, Minnesota, to construct a telephone system at that place.

Messrs. Harken & Son of Woodburn, Iowa, have purchased the exchange at Russell, which is said to be one of the best in southern Iowa in point of efficiency and construction.

C. D. Morey and Hugo Prill of St. Louis and G. E. Eis, Al Harding, Robert Rohl and others have secured a franchise to operate a telephone exchange at Centralia, Ill.

Harry Sotzen, manager of the Shelby, Ohio, local telephone company, and Miss Mary Patman, a society girl of Bellville, Illinois, were married at Cleveland June 2.

Miss Mary McClellan has been appointed manager of the collection department of the Independent Telephone Company at Urbana, Ohio, succeeding Carl Ross, resigned.

Samuel Jones of Jones & Winter, Chicago, recently paid a visit to their Texas telephone properties. He reports everything in that section prosperous and the outlook promising.

C. C. Conroy has recently effected a merger of the Beaumont and Northwestern Telephone Company of Texas with the Lone Star Company and the Commercial Telephone Company.

E. C. Drews, formerly manager of the Sunset Telephone Company at Colfax, Washington, with Ed Riggs will establish an electric light and telephone plant at Marshall, Oregon.

R. H. Redfield has been made manager for the Smithville, Texas, Telephone Company, succeeding A. L. Hill, who resigned to put in a telephone exchange at Honey Grove, Texas.

Leslie Martin, who has been acting in the capacity of night operator at the Cass County telephone office at Virginia, Ill., has been promoted to the position of assistant manager.

A. L. Denniston, the well-known telephone engineer, has accepted the position of superintendent of equipment for the Utah Independent Telephone Company, at Salt Lake City.

R. W. S. Negus, manager of the Automatic Telephone Company, at Albuquerque, New Mexico, was recently in Chicago and New York on business connected with his company.

Charles A. Otis, Jr., has been elected to the directorate of the United States and Cuyahoga Telephone companies to take the place of J. R. Sprankle, whose death occurred some time ago.

George M. Dugan, for many years connected with the Illinois Central Railroad as superintendent of telegraphs and telephones, has retired from the company and is succeeded by H. C. Grace.

Prof. W. E. Goldsborough recently delivered a lecture before the Pittsburg Technical Schools, at the Carnegie Music Hall in that city, on the subject of "Electricity as a Factor in Expositions."

Messrs. W. R. Bilyue, L. C. Stratton, G. A. McCart and others have been appointed a committee to look into the matter of installing an Independent telephone exchange at Albany, Oregon.

U. S. Thompson of Hoopestown, Illinois, has been granted a franchise at Villa Grove for the construction of an Independent telephone system. He expects to start with about 100 subscribers.

Miss Alice Hughes has resigned her position as chief operator of the Northwestern Telephone Exchange Company at Mankato, Minn. She has held a position in the office for the past six years.

C. R. Huntley, vice-president and manager of the Buffalo General Electric Company, Buffalo, New York, accompanied by his wife, sailed recently for Europe, where he will spend several months.

Frank Bowman of Hope, Indiana, has purchased the Hartsville telephone line and the Hope and Hartsville lines have been consolidated, thus putting an end to the rivalry between the two systems.

Thomas Parmalee and Bert Pollock, president and superintendent, respectively, of the Plattsmouth, Nebraska, telephone system, are working for the connection of the Plattsmouth and Lincoln systems.

W. S. Holloway of Salem, Ohio, has been appointed general manager of the northern half of the territory of the Columbiana County Telephone Company, which includes Lisbon, Salem, Sebring,

Leetonia, Columbiana, New Waterford, East Palestine and Rogers, Ohio.

D. W. Donaldson, E. J. Eaton, Rev. J. W. Finkviner and other citizens of Colorado Springs, Col., comprising the stockholders of the new Citizens' Telephone Company, are seeking a franchise in that city.

W. W. Bostwick, Jr., formerly with the Lambert Schmidt Telephone Manufacturing Company, has been appointed New York manager for the Couch & Seeley Company of Boston, Massachusetts.

J. J. Nate, representing the Stromberg-Carlson Manufacturing Company in the northwest, with headquarters in Minneapolis, Minn., visited Chicago recently and reports that business has been very satisfactory.

Howard J. Crawford, for the past two years manager of the Rhinelander (Wis.) telephone exchange, has been engaged by the directors to take the management of the Wausau Telephone Company's exchange.

De Witt Hansen has been appointed manager of the Fairbury (Neb.) Telephone Company to succeed Oren Nesbit, who has entered the employ of the Independent Telephone Company of Beatrice, Nebraska.

J. M. Oliver of Orlando, Florida, and others have incorporated the Florida Co-operative Telegraph and Telephone Company for $100,000 and will build a line from Jacksonville to Tampa, with numerous side lines.

G. G. Hostutler of Palmer, Kansas, and Henry Meierkord of Linn, Kan., are arranging for the consolidations of telephone systems in the two towns, the new concern to be known as the Twin City Telephone Company.

George E. Surratt, formerly of Fergus Falls, Minnesota, is now located at Chicago, where he has accepted a position as foreman for Brennan & Company, contractors on the cabling for the Chicago Automatic Telephone Company.

Thomas B. Jacobs, representing the Independent Consolidated Telephone Company of Milwaukee, was in Waukesha recently for the purpose of placing the company's six per cent preferred stock. The company will ask for a franchise in that city.

J. W. Stearns, R. H. Bell, E. R. Ford, F. M. Stage, James R. Paxon and D. Eckerson, organizers of the Citizens' Telephone Company at Akron, New York, have been granted a franchise by the board of trustees to build a telephone system in that place.

T. A. Norton of Cooper, Mich., has organized a rural telephone company. A similar organization has been formed at Alamo, which will be connected with the first at Andrews Corner. Chauncey Abrahams, J. Miner, M. R. Squire and others are interested.

Miss Jessie Green has tendered her resignation as local manager of the Eaton Telephone Company at Richmond, Ind., to take effect August 1. Miss Green has been connected with the company for the past six years. She will be succeeded by Miss Gertrude Pugh.

Alfred Slater, formerly manager of the Wisconsin Telephone Company in Janesville, and more recently in charge of the large Independent company's plant at Rock Island, has taken charge of the offices of the Beloit Telephone Company in place of J. E. Carr, resigned.

George E. Wheeler has severed his connection with the Modern Electric Company of Burlington, Iowa, and will travel through Iowa, Missouri and Illinois for telephone specialties. Mr. Wheeler also will push a patented engine for charging outfits for telephone exchanges, etc.

Arthur Dykema, who served for some time in Jackson, Michigan, as switchboard superintendent for the Citizens' Telephone Company, and who later became superintendent for the Washtenaw Home Telephone Company, is at present connected with the Frontier Telephone Company at Buffalo.

Henry A. Everett, president of the board of directors of the Cuyahoga Telephone Company, has made a proposition to the board of public safety of Cleveland to install and maintain a police-signal system. Mr. Everett said that the expense of installation and the cost of maintenance would be light.

V. C. Gilpin, sales manager for the De Beau Telephone Manufacturing Company, New York city, recently made a trip through the west and found an increasing demand for his firm's goods. The De Beau company will soon have established agencies in every city of importance in the United States.

Frank Spain, Jr., president of the Quitman (Ga.) Telephone Company, has purchased the telephone exchange at Adel, Georgia, formerly owned by William Clements. He will thoroughly overhaul and improve the system and it is possible that arrangements will be made later to connect the two systems.

President Eugene Satterlee of the Stromberg-Carlson Manufacturing Company of Rochester, N. Y., was tendered a luncheon at the University Club in Salt Lake City, Utah, by Elmer B. Jones. Among the guests were Senator Thomas Kearns, Frank Knox, George T. Odell, S. F. Fenton, Perry S. Heath, J. H. Young, E. B. Critchlow and S. V. Shelp. After lunch Mr. Jones showed the party over the new building of the Independent Telephone Company.

General Manager Johansen and Chief Engineer Jensen of the Copenhagen, Denmark, telephone company are inspecting the Independent telephone systems of America. They express themselves as much pleased and greatly astonished at the large telephone development in America, though they expected great things.

John H. Young, formerly with the Wisconsin Telephone Company in Milwaukee, has recently assumed the office of general manager of the Modern Electric Company of Burlington, Iowa. Mr. Young is a graduate of the University of Illinois in the electrical engineering course, and has had extensive experience in telephone work

Frank B. Cook has recently returned from a trip to the Deadwood Home Telephone Company, which he owns. He reports the company in a flourishing condition, and says that it is rapidly passing its Bell rival in the competition for subscribers. Mr. Cook returned by way of Omaha, Council Bluffs and Des Moines, where he called on the trade.

Attorney I. J. Hofmayer and Manager Powell of the Blakely (Ga.) Telephone Company are seeking a franchise for that company, which desires to enter Albany, Georgia, with long-distance connections between this point and a number of towns and cities in southwestern Georgia and southeastern Alabama. The headquarters of the company is Blakely.

Frank C. Smith of San Antonio, Texas, president of the Commercial Telephone Company, announces that he has purchased for his company the Independent telephone exchanges at Austin, Taylor and Belton, and that he has leased from the Beaumont Northwestern Telephone Company the long-distance lines and local exchanges belonging to that corporation.

Chuji Awoyama, electrical engineer to the Imperial Japanese department of communication and to the Imperial Tokio Telephone Exchange, has sailed for home after a brief sojourn in the United States. In a report which he will draw up for submission to the Japanese government he will recommend the purchasing of a big quantity of electrical apparatus in this country.

A. B. Ferdinand of Milwaukee, who applied for a franchise in Oshkosh, Wisconsin, some time ago, is taking steps to organize a corporation, and application for the franchise will be made by the corporation in order to conform to the city attorney's views, which were to the effect that franchises secured by individuals were practically worthless to companies afterward receiving them.

George H. Barker, vice-president of the American Conduit Company, passed through Chicago recently on his way to the California office of the company. Mr. Barker states that the demand for the American Conduit Company's product was never better. A. W. Buchanan, general manager of the same company, has been transferred from the Los Angeles office to Chicago. The company's Chicago office is located in the Manhattan building.

Ed. L. Barber of Barber & Brailey, the well-known telephone builders of Wauseon, Indiana, was recently in Cleveland, in consultation with United States telephone officials. Mr. Barber reported the telephone business good and prospects very bright indeed. The Barber & Brailey telephone partnership has recently been incorporated as the Central Telephone Construction Company and will continue the business of the Barber & Brailey partnership, which came to an end in April of this year.

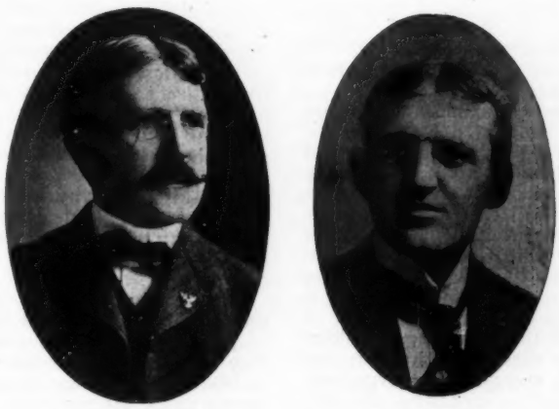
F. Lubberger, the well-known telephone engineer, who is at present connected with the Automatic Electric Company, Chicago, has opened an evening class in the Kimball Hall building, Chicago, for instruction in automatic telephony. The course will last approximately three months and the following subjects will be treated: Short review of electricity, magnetism, ampere volt ohm induction, electro-magnetism; manual telephony, the principles of talking, signaliing and switching circuits; Strowger automatic system: series and bridging switches, wall and desk telephones, systems for 100, 1,000, 10,000 subscribers, exchange building and cabling in detail, power-wiring in detail, alarm circuits and supervisory circuits, connection to manual exchanges, toll connections, information clerk's desk, trouble clerk's desk, wire chief's desk; other automatic systems.

Max Kosegarten of Berlin, H. Platz of Karlsruh and B. Goebel of Liege, directors and representatives of the Deutsche waffen und munitions fabriken, the German concern which controls the Strowger automatic telephone patents in all of Europe but Eugland and France, and which has recently installed in Berlin as a part of the government telephone system the same automatic telephone system that is in operation in Chicago, were in Chicago recently as the guests of the officials of the Strowger Automatic Telephone Exchange, the Automatic Electric Company and the Illinois Tunnel Company. They inspected the works of the Automatic Electric Company at Morgan and Van Buren streets and the tunnels of the Illinois Tunnel Company, and later went to St. Louis to visit the World's Fair. From there they went to Dayton, Ohio, and Grand Rapids, Michigan, to inspect the telephone systems installed there by the Automatic Electric Company.

Convention of Indiana Independents

Lafayette, Indiana, threw wide open its portals and extended the glad hand of hopsitality on June 28 and 29 to the members of the Indiana Independent Mutual Telephone Association, and Independent telephone men in general, who thronged to the beautiful Hoosier college town by scores and hundreds, and, besides making themselves perfectly at home and showing every indication of enjoying the warm welcome extended them, took great interest in the proceedings of the annual convention, which marked an important step in the forward march of the Independent telephone movement in Indiana. There were about 400 in attendance, including prominent Independent telephone men from Missouri, Illinois, Ohio and Kentucky, besides the large number from Indiana. Many manufacturers of telephones and telephone apparatus were on hand and made elaborate displays at Hotel Lahr, the headquarters of the convention, which was decorated in a most elaborate manner for the occasion.

One of the preliminary features of the gathering, and one which succeeded in arousing a marked degree of interest from the start, was the arrival at 12:30 p. m. on Tuesday of the train over the "Big Four" road bringing TELEPHONY's special car with the Chicago delegation on board. Over 200 members of the association, accompanied by a brass band, met the Windy City "brothers" at the train with music and cheers of welcome. A parade was formed at the station, headed by the band and the Chicago party, which marched to Hotel Lahr, where all registered with Secretary Metcalf and were furnished with badges and tickets. The badges were very neat and were furnished by the Sterling Electric Company of Lafayette, which firm left nothing undone that would add to the enjoyment of those present at the convention.



W. E. DOOLITTLE. G. A. BRIGGS.
GENIAL HOSTS OF INDIANA CONVENTION.

At 2:15 p. m. the entire telephone contingent again formed in line at Hotel Lahr, and, with the band leading, marched to Thomson's Hall, where the afternoon session was held. The convention was called to order at 2:30 by President Rome C. Stephenson of Rochester, Indiana. In the absence of Secretary Gates, Theodore Thoward, president of the Home Telephone Company, of South Bend, Indiana, was chosen by the convention to fill that position. President Stephenson then introduced Hon. R. B. Sample, the handsome and brilliant mayor of Lafayette, who delivered a brief but pleasant address of welcome, as follows:

We welcome to our city the representatives of the Independent union of telephone men throughout the United States. It is highly proper you should meet with us here, for I believe that in our beautiful little city and in the country surrounding you will find more telephones in use than in any community of like numbers in the country.

Here, also, is the home of the Sterling Electric Company, likewise the stamping ground of immortal Walter Doolittle, who manufactured and put in proper form and place all the intricacies of the telephone, which enables us to talk with our friends in other cities and in other states. To these institutions and these representatives, who have done so much to facilitate the comforts and the business interests of the country, I extend a hearty greeting. The keys of the city I turn over to you, also the freedom of the streets and alleys. Gentlemen, the town is yours.

In behalf of the association President Stephenson made the following fitting and felicitous reply:

In the early part of 1896 the Independent Telephone movement began in Indiana, and from the first success has attended the efforts of the workers in the Independent cause in this state. Capitalists have invested largely in the developing of the Independent field in Indiana, which has been rapid and little short of marvelous. The pioneers in the movement met with unprecedented patronage and encouragement. In the initial stages of the work of opening up the Independent field the exchanges were scattered over the state, few and far between, and had the bitter opposition of the Bell company to contend with—a fight for their very existence from the start. Happily, conditions have now changed, and at the present time there is hardly a hamlet, village, town or city in the entire state but that has a prosperous Independent exchange, and the list is growing every day.

This Association, composed of Indiana telephone men throughout the state of Indiana, is not organized for the purpose of raising rates (though the Lord knows they are low enough), but to exchange ideas and plans looking toward the further development of the Independent movement in the state to bring together all Independent telephone men in Indiana that they may become better acquainted, learn to appreciate their true strength and power and thus aid the cause of Independent telephony.

This is the second convention which this Association has held in this beautiful city on the banks of the Wabash, and Mayor Sample's words of welcome we have just heard, I am sure, voice the feeling of Lafayette's citizens as a whole. We appreciate the hearty, cordial greeting extended us and feel that our brief stay in this city will be one of pleasure to all and will surely be an incentive to all Independent telephone men present to work harder than ever for the cause.

The first paper to be read was on the subject "How to Make an Independent Telephone Man," by Prof. J. C. Kelsey of Purdue University, who occupies the chair in telephony in that institution. He said:

Our own state of Indiana is the banner Independent state, which fact should give the operators and manufacturers just cause for congratulation, and particularly, justification for enjoying to its fullest extent this convention, and the entertainment laid out by the genial overseer of the destiny of the Sterling Electric Company. Ohio has her Cincinnati, Illinois her Chicago, Wisconsin her Milwaukee, but Indiana has conquered every obstacle, for there is no place where the Independent does not reign supreme. The telephone men of Indiana were first in the field, and with faith and foresight, trusted in the mutual common sense of the people to perceive that the Independent telephone movement was not a selfish, capitalistic enterprise, but one in which the public would have the greatest share. That the pioneers reckoned wisely is an old story.

In warfare, after some point of advantage has been gained, usually with great sacrifice, the victorious army does not rest upon its glory, but pursues its advantage to the furthest extent, so that the enemy will have no chance to retrieve. Telephone warfare is just as unrelenting, and it is not a question of hours, or even days, but an inevitable question of the future, that the enemy will return to the scene of action, when all the veterans of experience and training in the hard school of action have passed the age of exemption. The sons of these pioneers will have a hard battle to fight and their losses will be greater possibly, for the fighting will be in close order.

That the enemy's tactics have changed is shown by the reor-

ganization of the Central Union Telephone Company. It calls for much money, which is an old story, and great numbers of young, well paid, energetic and well trained telephone men, which may be said to be a new story. These young men are being placed in every part of the system having vital importance. Experience has shown that millions of dollars will not help this defeated company one small jot, as the Indiana mind is not at all mercenary. But who can deny the value of a bright, accommodating, wide-awake man at every strategic point. It will have to be admitted that he will make progress rather than retrogression, in spite of the greatest difficulties. And if the efforts of these men are not counteracted, or matched by equally careful and astute men, the danger is evident. Public sentiment and public memory are among the mightiest battleships of the Independent fleet, and must be protected from these torpedo-like young men.

How many men at this convention are absolutely certain that the money they have invested in telephone properties is not endangered by the employment of indifferent men, who have neither the knowledge of human nature nor the appreciation of the public approval or sense of responsibility to be trusted to such a task? If a company of men turned over $50,000 to a young, inexperienced man, and instructed him to invest it as he saw fit, we would have reason to call them insane. But this same company can turn over the destiny of a $50,000 plant to the same inexperienced young man, working at a low salary, and pride themselves on an economical and wise course of action. That these companies survive and do business is only a monument to the strength of the Independent cause.

The telephone business is a peculiar one. It has a close relation to and is near to the hearts of the people. It is one of the family—that instrument on the wall. It is a part of the speech, and the American people prize liberty of speech and the opportunity to do lots of it above all other privileges, and at the least cost, too. Being one of the family, the telephone is treated with patience and kindness, and when the subscriber does finally kick, it is bearing out the idea that "Whom the Lord loveth He chasteneth." Therefore, the telephone having a personality, dear to the people, it follows that the telephone manager must have a personality dear to the people and appreciative of their best interests.

When a young man desires to be a lawyer, in most every case he makes his way to a law school; the budding doctor finds his way to the medical school, the preacher to a theological school, and the surveyor and bridge builder to a school of civil engineering. Later, the machine shop man and worker in steam and iron enters a school of mechanical engineering. In the last few years it has been conceded that the budding electrical engineer should finish in a school of electrical engineering. The last school features are commerce, insurance and telephone engineering. The idea of teaching telephone engineering is new, and finds many opponents. That is natural, but who can stop for a moment to consider the amount of money invested in telephone utilities, and the numerous problems connected therewith, and deliberately say that the subject is unworthy of specialization. But this is not the place for argument, and the desirability of a school of telephone engineering can only be proved when the young men enter the institution and signify their intention of pursuing the study of the business and science.

Purdue University undertakes to make the young man of Indiana appreciate and understand the problems connected with telephone engineering, by work in class room, laboratory, and visiting of operating systems. The work is on practical lines strictly. The general idea may be given by an opinion of President Stone of Purdue that a new school of engineering must be strictly practical so that it will be valuable to the community. If there is no demand for the graduate, there is no need of maintaining the school. After the school has progressed, and has numbers of graduates in various useful and influential places, a clientele, as it were, then it can delve into theory and investigate the problems that are beyond.

The young man spends two years in general study of mathematics, chemistry, drawing, wood, forge, molding, and machine work, preparing for the two final years of special study, of electrical engineering. Here comes a slight parting of ways, for the telephone student does not take up steam problems, but takes telephone engineering instead. He learns to design any form of dynamo and motor and test them out. He makes a specialty of storage batteries, with the various types of boosters, motor generators, etc. He studies history, political economy, languages and other topics outside of technical features.

His telephone work begins with transmitters, receivers, induction coils, shunt and bridging generators, ringers and hook switches. He then takes up series and bridging line practice, with the selective lookout features. Then the local battery exchanges, from 100-line to 500-line transfer to 3,000-line multiple. The common battery systems follows—Sterling, Kellogg, Stromberg, North, American, International, Bell, and others. After the manual systems are studied out, the detailed study of the automatic systems follows, the Strowger and Faller in succession. The apparatus for the experiments is mounted on blocks, terminating in binding posts, so that rapid connection may be made by tipped cords. Finally, the construction period, in which all forms of overhead and underground systems are investigated, and telephone systems as a whole are designed. None but actual working systems are studied, as time forbids working on things which have no direct bearing on telephone practice of the present day.

Purdue is an Indiana institution, is supported by Indiana people, and it desires to serve the best interests of the Indiana people. It stands ready to welcome your sons, and will do all in its power to make the Indiana telephone man a power, not only in his own state, but in all the states of the Union.

The next paper was on the subject of "The Part Played by the Press in the Development of the Independent Telephone Field." Its author was Henry A. Barnhart of Rochester, Indiana, who, after giving a breezy, facetious introduction to his effort, addressed the convention as follows:

If people could only remember, or be considerate enough to stay convinced, or did not need be told and shown, or did not like to be coaxed by attractions; or were constitutionally disposed to stand still; or were not everlastingly "looking 'round" for something better and cheaper, there would be no necessity for traveling salesmen and advertisement writers. John Wanamaker would not be rich, and I would not be here preaching the wholesome gospel of "he who bloweth not his own horn, for him it shall not be blown."

You doubtless infer from this that I am going to tell you how to get rich quick by convincing everybody that they need telephones—which they do, and by proving most all of them to be Missourians—which they are.

Away back in the days when a certain prophetic citizen, named Noah, wanted passengers for his ship, he publicly advertised that he would sail on a certain day, and all who did not get aboard would get left. You know what happened to the multitude who said, "it's only an advertisement" and it has been happening to their kind, in a commercial way, ever since.

Whether or not Noah's Ark sailing advertisement was the first, we know that advertising has grown from year to year until the success of every undertaking which depends upon public interest—be it politics, religion or business, must have judicious advertising for its basis. This is a busy age, and people have little time to hunt for what they want, and most of them have grown into the habit of going directly to the advertising columns of newspapers and other periodicals to find what they need and where to go to get it.

For instance, why do we all go to Kentucky for our morning eye-openers, to Battle Creek for our breakfasts, and to Milwaukee for our afternoon sociability? Is it because their brands are so much better than others; and if so, how did the millions find it out?

The answer is very easy. Their manufacturers have "blown their own horns" and let the world know they have the goods.

And they have not trusted it to the mere announcement that they had good things. They have kept everlastingly at it, and when an old one who has been thoroughly and sufficiently convinced passes away, his successor is educated up to the fact that he gets his health from Battle Creek, his warmth from Louisville, and his self-sufficiency from Milwaukee.

But I need not elucidate farther. You are all business men and you know how it is yourselves.

And just here, I apprehend you are plying me with the mental query, how much shall we advertise and what good will it do?

As to how much, that depends on your ability and the possibilities that surround you. The customs of communities vary greatly. For instance, in my own beloved city of Rochester our fishing parties equip themselves with good tackle, ample lunch baskets, enough cash for boat hire, and the sword of truth. In my neighboring city of Logansport, a vastly opposite sentiment prevails. There, it is reported, a fishing party recently hired a chef and commissary authority combined. They gave him ten dollars to go out and buy supplies, and when he returned with nine dollars' worth of whisky and one dollar's worth of bread, they discharged him for squandering too much money for bread. He lacked familiarity with his environment.

First, then, it is important that we be fully acquainted with our community and the reach of our directors' backbone. If we want to do a telephone business as a side issue to other vocations, for the good of the community or just to show some other fellow how easily and cheaply a telepohne plant will do things, it would possibly be permissible to let the business run itself, advertise itself, and eventually "bump" itself. But if we would make it successful, it must be wormed into the hearts of the people by merit and enterprise.

In the telephone manufacturing industry there are names of manufacturers and apparatus which are, so to speak, household words with us operators. And we buy, generally speaking, that with which we are most familiar. And we are usually most familiar with that which is presented most frequently to us. Therefore, if we are induced to patronize certain manufacturers most because we see and read most of them and the merits of their products, the importance of our making the general public familiar with the telephone service we give must be equally apparent.

The wise telephone operator, as well as every other prudent citizen, can well afford to cultivate the good will of the press in his community. I do not mean by this that there should be attempts at direct or indirect bribery, for that would be taking a hazardous risk of being run out of an honest man's office. But rather, that the operator look well to his press bureau, give the newspapers all the favors he can without sacrificing business interests, and in ninety-nine cases out of a hundred they will return publicity favors to fully recompense the operator for the "bread cast upon the waters."

Further than this, a direct system of advertising in the newspapers is very effective. For instance, if Mrs. Bedott and Mrs. Shiner and Mrs. Gostrong have telephones put into their residences, see to it that the local news columns of your home paper tells it to the world and you will set a dozen angelic top knots to wigwagging in that same neighborhood, and a dozen tactful and persuasive tongues will tell their husbands, "we can have a telephone as well as they." And your orders for telephones will increase.

If a business man sees it announced to the community that his competitor has had a telephone put in, a ginger-like sensation will come over him and you get another order for a business telephone.

But even this will hardly be enough. If you will occasionally hand your local newspaper a book of coupons to be used within your field of operations for news getting, you will lose nothing, for it will frequently be mentioned in the papers that this and that important news article came by telephone. That keeps the public advised that your toll lines reach surrounding points and your toll receipts will increase as a result.

And, however we advertise, we should keep two important requisites for success in mind. First, give a telephone service that is meritorious and doesn't halt in advertising endeavor. That old lady who said her memory was poor but her "forgettery" good, was a typical representative of the busy people of to-day, and the advertiser, in whatever line, who succeeds best, talks his business to the public constantly and puts it in the most attractive and impressive form.

Personally, I have had considerable experience in advertising, and when judiciously done, it has always paid large returns. As manager of our local telephone system, I talked our business up so lively in the newspapers of the community, I almost lost my job. Business increased so rapidly the board of directors refused to borrow any more money for extensions of the plant and I was compelled to either quit advertising or resign, and you know a Democrat never resigns. Therefore, I am at this particular moment, speaking to you under the embarrassment of having more business than capital, but I do not know of any stock in my company for sale.

Another bit of personal experience in advertising possibility and I will spare you. Some years ago I purchased a well behaved but humbly bred rooster for fifty cents, and by advertising inquiry as to how many feathers were on him, the gross cash income amounted to something over 5,000 per cent on the investment. In addition to the pecuniary gain, I enjoyed the pleasure of participating in a banquet at which this same famous fowl graced the center of the table, after having increased my business more than 25 per cent. But it was not in the telephone business. If it had been, it would have put all my directors up trees through fright that our business would have been growing too rapidly.

Your program committee delegated me to address wou for fifteen to twenty minutes and accompanied the permit with an injunction that I avoid statistics.

And so, in the language of Mr. Dooley, "Thar're y' are."

"The Use of the Telephone on Railroads," by A. G. Francis of Chicago (which paper was originally read at the convention of the Association of Railway Telegraph Superintendents at Indianapolis, and which appears in full elsewhere in this issue of TELEPHONY) was read by Mr. Fisher of Indianapolis.

Col. A. L. Tetu, general manager of the Home Telephone Company of Louisville, Kentucky, was introduced next and gave a brief and entertaining talk, though his name was not on the programme. He said:

Six years ago Walter E. Doolittle, "the immortal Doolittle," as some one before me has said, was a subordinate of mine. Think of it! At that time I was a high officer of the Bell company with offices in Chicago, and was sent down to Lafayette to see Mr. Doolittle on business. I could not find him at the office, and none of the employes knew where he could be located. When I went back to Chicago I reported that Doolittle was no good, as his methods were not to my liking. The next thing I heard from him he was manager of the Lafayette telephone company. Now he has charge of the Sterling Electric Works. Kentucky greets you and it is a pleasure to me to come to this meeting, though it was to listen and not to talk that I happened in Lafayette. I learned the telephone business in Illinois and found competition in Indiana. I was long in the employ of the Bell Telephone Company, but feel more satisfied out of its ranks and into the Independents'.

The most important thing in making a successful telephone company, next to first-class equipment, is first-class operators. The girls can make you or they can break you. We must have good telephone operators. A telephone man must have regard for the telephone girl—the barometer of his success. The girl is not there because she finds it a pleasure, but because she has to work. And any subscriber who abuses a telephone girl at the other end of the line for no sufficient cause is a brute, and not worthy of a place among white men. And a telephone manager who will not rip out the telephone of that subscriber does not deserve success. If I do no better than to aid the crusade for the demand for kind words for the telephone girl, I will consider my visit well worth the while. Let us all get together and make the life of the girl pleasant instead of full of misery. She is our stock in trade. Kindness shown to the operators will repay us a hundred fold.

At the conclusion of Mr. Tetu's happily expressed address, President Stephenson introduced S. G. McMeen, a telephone engineer from Chicago. Mr. McMeen returned thanks for the opportunity of facing the Indiana association, and laid claim to a right to share with them the honor of native Hoosierdom, as he was born in the state, was a Purdue University boy more years ago than he cared to explain, and began in the telephone business in the convention city of Lafayette. He charged George Ade with having said that he would never go back on or to Indiana, but for himself, disclaimed endorsing the latter part of such a statement.

Admitting an experience in the business of twenty years, and claiming more intense interest in telephony and its great variety of activities than in anything else, Mr. McMeen devoted some time to comment upon the immense social and commercial advantage of such a telephone development as is coming about through the activities of the Independent operators, such as compose the Indiana association. He expressed the conviction that the future usefulness of telephone communication will very soon show to be such as to surprise even the present optimistic and energetic promoters. For definite and convincing reasons it was his conclusion that the development in the next ten years, particularly in the middle West, would be very much greater than in the ten years past. It was his inclination to rank the importance of the telephone above that of other means of communication, and to place it alongside transportation, as measured by its effect upon communities and their relations with each other.

Mr. Tetu then asked the Association to extend its greeting to Mr. McMeen, who has only lately entered the Independent field. A hearty response followed, not the least of which was three rousing cheers for Mr. McMeen.

H. B. McMeal of Chicago, representing TELEPHONY, was called to the platform and made a few remarks.

Walter E. Doolittle, president of the Sterling Electric Company, was called out and said that he had too many other things to think about without attempting to make an address.

President Stephenson then made a number of announcements and the first business session of the convention adjourned.

The visiting delegates and about 3,000 citizens flocked to Tecumseh Trail, an amusement park about four miles distant from the city, in the evening, to witness a vaudeville entertainment and hear a band concert. These same delegates and 3,000 citizens flocked back to the city near the midnight hour, some on foot, others by farm wagons, still others by boat, and those who had plenty of leisure time on the street cars. A breakdown on the trolley line kept hundreds at the park until nearly 1 o'clock. The evening's entertainment was given under the auspices of the Sterling Electric Company of Lafayette and the Chicago Telephone Supply Company of Elkhart. The vaudeville was the work of local artists and the show was one enjoyed by all who saw it. The band concert was given by the Indiana State band of Otterbein, and was one of unusual excellence.

The telephone men left the city at 7:15 o'clock on special

cars and on reaching the Trail spent the time previous to the opening numbers of the evening's programme in rambling around in the footsteps of the famous Indian war chief, Tecumseh, and from the noise some of them made one would have been led to believe that the famous band of redskins had returned to their favorite haunt along the banks of the deep and placid Wabash. The familiar "hello" of today gave way to the mighty war whoop of years ago, and then, to see these very same palefaces silhouetted in the shimmering moonlight of the midnight hour, following the dusty River road trail to the city, recalled the famous stories of days gone by.

The programme of the evening commenced at 8 o'clock. Walter E. Doolittle of the Sterling Electric Company was master of ceremonies, and he filled the position in his usual gracious manner. Aside from the vaudeville acts there were brief, bright, breezy speeches by Col. Tetu, George Briggs, F. L. McGillan and others, each of which made a decided hit.

The programme of Wednesday, the second and last day, was opened up at 9:30 a. m. by a trolley ride over the city and a visit to Purdue University, where some 250 of the delegates were privileged to inspect the various departments. The party was led by Prof. J. C. Kelsey of Purdue. The visitors were taken to the agricultural building where, in the dairy, Prof. H. E. Van Norman had an exhibit, which caught the eye of the co-operative people and those from rural communities. The buttermilk caught the taste of the city folk as well as the others. The party also visited the mechanical engineering building, where the big testing engine was shown off; they were taken through the buildings and shown the different departments. In the electrical building the telephone men found something of especial interest when they encountered the laboratory of telephonic machinery. The department was explained by Prof. Kelsey and the party were much pleased with their visit to Purdue. The visitors spoke highly of the institution. The trolley ride was the compliments of the Sterling Electric and Chicago Telephone Supply companies—in other words those two princes, George Briggs and Walter Doolittle.

The time from 11 until 12 o'clock was given over to the inspection of the exhibits by the visiting telephone men, and nothing but words of praise were heard for the various displays.

At 2:30 o'clock the convention was called to order by President Stephenson, who introduced Hon. John F. McHugh, counsel for the Sterling Electric Company, as the first speaker. Mr. McHugh's subject was "An Attorney's Impression of the Independent Telephone Field." He spoke as follows:

An attorney's first impression as he candidly and fully views the Independent telephone field is that it is composed of royal good fellows and true gentlemen, men with foresight, men with fixed purposes, men with determination, men who knowing right dare do it, men whose first aim is to serve the public, and last, but not least, courageous men who face the enemy and in every contest achieve victory. Another impression, and one that soon ceases to be an impression and becomes a fact, is that the Independent telephone has had to fight for its life inch by inch against the strongest, or at least one of the strongest, monopolies of modern times—the Bell Company—and has made its fight with courage, with calmness, with loyalty to the public and with a fixed determination to win. When the Independent movement first started we were like the Irish soldier who went all through the war, and a gentleman said to him one day, "Pat, did you come through the whole war without a scratch?" Pat answered, "Not I, yer honor; once a bullet went right through here," and Pat pointed to his left breast. "Surely not," replied the gentleman; "it must have hit your heart if it went through there." "Och, yer honor, not at all, not at all; sure me heart was in me mouth all the time." So with the Independents when they first began their fight against the monster monopoly that clutched the American public by the throat—their hearts were in their mouths—but to-day, after many hard battles we have come out sound, normal and with a firm determination and purpose to continue the good work begun and to constantly merit not only the good will but the approbation of the public as well.

Another impression that an attorney has of the Independent field is that the opposition counts less as the years progress and the public realize the benefits that accrue to them by virtue of the Independent service. And this reminds me of a little story of an innocent German on the witness stand, who was being badgered by the lawyer on the opposite side. A case was being tried in court and the particular question at issue was the number of persons present when a certain event occurred. The honest but simple-minded German had never taken an oath before and was not a little disconcerted. The lawyer who conducted the cross-examination saw his opportunity and badgered him with questions, after the manner of his kind. "How many did you say there were present?" he shouted, bringing his fist down upon the table, as though the fate of an empire trembled in the balance. "Vell," meekly answered the witness, "off course I gould not chust say, but I dinks there was between six and sefen." "Tell the jury what you mean by that," roared the lawyer. "How could there be between six and seven? Were there six or were there seven?" "Vell," answered the witness, "maybe I vas wrong. Dere vas more as six, but dere vas not so much as sefen—one vas a fery little poy." So, as time develops our usefulness, our sincere desire to serve the public and the benefits that accrue to them, the opposition are like the little boy in the story—they don't count for much, or at least only for a little.

Still another impression that an attorney has of the Independent field is its non-selfish attitude with refrence to the public. It is willing to serve them and does not want *all* they have for such service. Rates are fair, service good, the public interests considered, courtesy always extended. We have had to meet unfair and unjust competition. The monster monopoly, here, there and everywhere, in the hope of exterminating the Independents, and thus annihilating competition, has lowered rates beyond ours. For what purpose? For the honest purpose of continuously and ultimately helping the public? Nay, nay, but solely to crush its young competitor and then again fasten the coil of high rates on the public. But the game is an old one and the public has been duped so often before that it cannot now be caught with chaff, and loyally do they give the Independent aid and support. This reminds me of the story of the Irish policeman, who had just been put on the force, and the next morning in court, after his first night out, the magistrate said to him, "Did you notice any suspicious characters about the neighborhood last night?" "Shure, yer honor, I saw but one man and I asked him what he was doing there at that time of night? Sez he, 'I have no business here just now, but I expect to open a jewelry sthore in this vicinity later on.' At that I sez, 'I wish you success, sor.'" Magistrate (after a pause), "Yes, he did open a jewelry store in that vicinity and stole seventeen watches." New policeman (after a pause), "Begorra, yer honor, the man may have been a thief, but he was no liar." Our friends, the enemy, differ in this, in that if they can deceive and lie a little to the public to cause our downfall they will do so. After being detected at their old game of lowering rates and their promise always to maintain low rates, with opposition gone their rates raise again and then they attempt to dodge consequences as the nigger did when he was charged with stealing a rooster. "You say you are innocent of stealing the rooster from Mr. Jones?" said the judge. "Yes, sir, I'se innocent, innocent as a child." "You are confident you did not steal the rooster from Mr. Jones?" "Yes, sir, and I kin prove it." "Well, how can you prove it?" "Cause dat night I stole two hens from Mr. Smith dat lives at Buck Creek, fifteen miles away." So our friends would be if we were annihilated.

Lastly, an attorney's impression of the Independent field is that it is one of the greatest benefits in aid of modern progress. Think of it; a very few years ago the telephone was a luxury, prices and rentals were high and the monopoly did nothing to serve the great masses of the people. To-day the telephone, thanks to the Independents, is a necessity, and every little home, as well as every palace, every small village and hamlet, as well as the large cities, enjoys its usefulness. The contest against might by the Independents has been fierce, bitter and strong, but you have triumphed. It could not be otherwise. You are men who, knowing the right, dare to do it. You are men of standing and ability. You are men who feel and know that the public have rights and you respect and serve them. You are men of sagacity and foresight. You are brave men, for it takes men of genuine courage to face the "telephone monopoly" that was and engage in a death struggle with it and achieve a victory.

Is all this without reward? No! The great public, ever appreciative, are watching your movements and your progress and are wishing you not only success, but giving you substantial aid. The Independent will, in time, as I look down the pathway of the future, be the great, true and tried friend of the public, and will always protect their interests. In so doing success will be yours and it will be a success based upon the foundation stone of genuine merit, which always brings its own reward.

L. R. Sale of Indianapolis, who was to read a paper, could not attend the convention, but he sent his paper by Charles S. Norton of the New Long Distance Telephone Company of Indianapolis, who read the same. The title of the paper was "The Relations of a Purchasing Agent to a Successful Telephone Company." E. M. Coleman of Louis-

ville, who is secretary of the interstate association, could not be present. He was to have read a paper upon "Are Conventions Beneficial to the Independent Telephone Movement?"

Resolutions thanking the Sterling Electric Company, the Chicago Telephone Supply Company and the people of Lafayette as a whole, on behalf of the association, for the entertainment provided and hospitality shown, were read by Secretary Thorward and unanimously adopted.

A nominating committee consisting of G. S. Van Dusen of Michigan City, D. E. Miller of Flora and Elmer Schweitzer of Tippecanoe county, were appointed by President Stephenson to select a list of new officers for the ensuing year. Their choice was unanimously approved by the convention. The new officers are:

President—Theodore Thoward, South Bend.

Vice-President—C. A. Reeves, Plymouth.

Secretary—J. W. Johnston, Elkhart.

Both Mr. Thoward and Mr. Johnston made fitting remarks acknowledging the honors that had come to them, the former also dwelling upon the need of still more hearty co-operation in the Indiana Independent field and the latter touching upon the question of toll line service.

President Thoward's first official act was to suggest that a legislative committee be appointed. H. A. Barnhart made a motion that the newly-elected officers be empowered to act as this committee. His motion was seconded and carried.

C. S. Norton of Indianapolis, H. A. Barnhart of Rochester and John Bell of Salem were named as a committee to report at the next meeting on a plan for the standardization of toll lines.

This closed the business of the convention, which adjourned at 4 o'clock. Though no place was chosen for the next meeting, it is understood that Elkhart will be selected for the convention of 1905.

At 5 o'clock the telephone men left Hotel Lahr in the wake of the convention band and marched through the streets to the steamer "Tecumseh," to again partake of the open-handed hospitality of the Sterling Electric Company and the Chicago Telephone Supply Company, in the form of a boat ride on the beautiful Wabash river to German National Park, where a sumptuous banquet and a delightful band concert were given. The irrepressible, unequaled and clever Walter Doolittle acted as toastmaster at the spread, at which over 200 were seated. By his persuasive eloquence he succeeded, after the superb "feed," in inducing the only Col. Tetu, George Briggs, F. L. McGillan, Paul Latzke, F. F. Sapp, Prof. Kelsey, H. E. Babcock and others to turn loose their flood gates of oratory and anecdote, which proved a source of edification and entertainment to the large crowd, which was in a jolly mood and cheered the speakers to the echo.

It was near the midnight hour when the good steamer "Tecumseh" drew away from the banks of the Wabash and churned her way homeward by moonlight with the merry-making telephonists on board. Arriving at the city dock the delegates again formed in line behind the band and to the inspiring notes of "There'll Be a Hot Time in the Old Town To-Night," marched to Hotel Lahr, where au revoirs were said, and the biggest, liveliest, most enthusiastic and most fruitful convention ever held by the Indiana Independent Mutual Telephone Association came to a happy finale, with only the most flattering words heard for the hosts, the city and all concerned in making the convention the great success it was.

The manufacturers' exhibits at Hotel Lahr were tastefully arranged in the different parlor floor bedrooms and sample rooms and every mechanism and appliance used in modern telephony was displayed. Improvements are constantly being made and the genius of inventors is adding new devices every day. The exhibits were complete in every detail, showing the latest improvements, and attracted a great deal of attention. All of the rooms were decorated with flowers and the displays were made in a very attractive way.

The Sterling Electric Company's exhibit was in rooms 4 and 5. Among the different types of apparatus shown were their lamp signal magnetic switchboard, sectional type switchboard, standard Bell type switchboard and common battery multiple switchboard, and their new type of farmers' switchboard. All of the different types of telephones were shown and a set of party line telephones were in operation. Their new No. 118 telephone caught the eyes of all and it was vouched that it would certainly take the place of many of the present type of magneto telephones. There was also a complete line of the famous Sterling protectors, including a large frame of their new type No. 4 protectors, also another frame of their type No. 237. They also exhibited a telephone pole, which had mounted upon it their new type of pole seat and pole house, with tubular fuse and carbon mounted on the inside of the pole box. All of the Sterling equipment was in full operation and the different facts that have been stated by them regarding their apparatus were fully demonstrated by the successful operation of all the equipment. Their souvenirs were small miniature desk telephones. Walter E. Doolittle, president, was assisted in receiving the different delegates by W. R. Coffroth, secretary and treasurer; Evan Shelby, sales manager; H. W. Doolittle, order department; H. T. Doolittle, purchasing agent; S. B. Fowler, electrical engineer; H. E. Denig, chemist; H. S. Bullock, superintendent; F. M. Ross and G. W. Metcalfe.

The Chicago Telephone Supply Company of Elkhart, which was one of the hosts of the occasion, had an elaborate display of its well-known apparatus, in charge of George A. Briggs and G. W. Brown. It attracted a great deal of attention and favorable comment.

Other houses that had exhibits and their representatives in charge were as follows:

American Electric Telephone Company, Chicago; J. G. Ihmsen, P. J. Eubanks, P. R. Hauptman.

Monarch Telephone Manufacturing Company, Chicago; E. E. Yaxley, W. H. Trimm.

Swedish-American Telephone Manufacturing Company, Chicago; C. H. Macklin, J. A. Russell.

Holtzer-Cabot Electric Company, Chicago and Boston.

Varney Electric Supply Company, Indianapolis.

International Telephone Manufacturing Company, Chicago.

Central Electric Company, Chicago; J. W. Mason, J. H. Harris.

Automatic Electric Company, Chicago; J. F. Crook, C. H. Fisher, H. D. Ogden, F. S. Engh.

Crawfordsville Wire and Nail Company, Crawfordsville, Indiana; Richard Schweitzer. Mr. Schweitzer distributed hundreds of neat wire canes among the delegates and made himself very popular.

North Electric Company, Cleveland; F. F. Sapp, C. H. North, George B. Pratt, C. D. Boyd.

Century Telephone Construction Company, Buffalo; Will W. Kidney, G. F. C. Bauer, H. S. Grant.

Miller Anchor Company, Norwalk, Ohio; G. H. Miller.

Crouse-Hinds Electrical Company, Chicago.

Monarch Electric and Wire Company, Chicago

Chicago Writing Machine Company, Chicago; E. L. King.

Frank B. Cook, Chicago; F. B. Cook, F. W. Pardee, F. R Parker.

Valentine-Clark Company, Chicago; F. L. McGillan.

Stromberg-Carlson Telephone Manufacturing Company, Chicago and Rochester, N. Y.; E. P. Shafer.

Eureka Electric Company, Chicago and Genoa, Illinois; I. J. Kusel, H. Rosenow.

The following list of delegates and Independent tele-

phone supply men includes nearly all those in attendance at the convention:

W. W. Kidney, Century Telephone Company, Buffalo; J. D. Downer, *Western Electrician*, Chicago; George W. Brown and G. A. Briggs, Chicago Telephone Supply Company, Elkhart; J. A. Russell, Swedish-American Telephone Company, Chicago; R. Schweitzer, Crawfordsville Wire and Nail Company, Crawfordsville; R. C. Stephenson, Rochester Telephone Company, Rochester; A. A. Adams, Whitley County Telephone Company; John C. Murray, International Telephone Manufacturing Company, Chicago; Gustav F. C. Bauer, Century Telephone Construction Company, Buffalo; Theodore Thoward, South Bend Telephone Company, South Bend; B. O. Wells, Charleston Telephone Company, Charleston, Ill.; Paul Latzke, *American Telephone Journal*, New York and Chicago; C. J. Arterburn, Kansas Telephone Company, Kansas, Ill.; H. S. Grant. Century Telephone Company, Buffalo; R. F. Blount and W. S. Stett, Home Telephone Company, Wabash; Fred G. Batz, Varney Electric Supply Company, Indianapolis; J. S. Engh, Automatic Electric Company, Chicago; P. J. Eubanks, American Electrical Telephone Company, Chicago; A. E. Dunder, Holtzer-Cabot Electric Company, Chicago; J. H. Bell, Hoosier Telephone Company, Salem; J. M. Zion, Clark's Hill Co-operative Company, Clark's Hill; E. H. Blume, Indianapolis; L. A. Horney and J. H. Horney, Home Telephone Company, Clinton; C. L. Fisher, H. D. Ogden, J. F. Crook, Automatic Electric Company, Chicago; F. J. Goodwine, West Lebanon Telephone Company, West Lebanon; Alfred F. Potts, R. S. McOoat Supply Company, Indianapolis; George B. Pratt, North Electric Company, Cleveland; W. S. Bissell, F. Bissell Company, Toledo; A. E. Peterson, West Lebanon Telephone Company; F. F. Sapp, North Electric Company, Cleveland; E. A. Williamson, North Electric Company, Cleveland; W. L. Harris, Delaware and Madison County Telephone Company, Elwood; H. Rosenow, Eureka Electric Company, Chicago; C. D. Boyd, North Electric Company, Cleveland; F. R. Parker, Frank B. Cook Company, Chicago; C. M. McGregor, Posey County Telephone Company, Mt. Vernon; I. L. Arthur, Varney Electric Supply Company, Indianapolis; J. G. Brobeck, Simplex Electrical Company, Chicago; T. H. Harris and J. W. Mason, Central Electric Company, Chicago; F. O. Rusling, M. B. Austin Company, Chicago; William Pogue, Central Energy Telephone Company, Frankfort; A. J. Troxell, Mulberry Telephone Company, Mulberry; W. A. Cole, Mulberry; Le Grande Marvin, Central Energy Telephone Company, Frankfort; W. W. Rose, Rossville Home Telephone Company, Rossville; E. Walker, Carroll Telephone Company, Delphi; E. V. Fitzpatrick, Co-operative Telephone Company, Portland; F. W. Warner, Warner Electric Company, Muncie; W. W. Mendenhall, White Star Telephone Company, Westfield; R. Wickersham, Carmel Mutual Telephone Company, Carmel; William D. Baldwin, White Star Company, Westfield; H. F. Gallimore, Citizens' Telephone Company, Zionsville; G. E. Varney, Varney Electric Supply Company, Indianapolis; H. C. Moore, Varney company, Indianapolis; George H. Miller, People's Telephone Company, Mulberry; John W. Kerlin, Rockfield Co-operative Telephone Company, Rockfield; W. C. Bogue, American Steel and Wire Company, Chicago; J. W. Stone, Arcadia Telephone Company, Arcadia; H. G. Lutz, Odell Telephone Company, Shadeland; Nathan Shuts, Crouse-Hinds Company, Chicago; E. P. Shafer, Stromberg-Carlson Company, Chicago; L. J. Patty and J. R. Collins, Carmel Mutual Telephone Company, Carmel; W. B. Foresman, Odell Telephone Company, Glen Hall; J. B. Myers, Indianapolis Arm, Bracket and Pin Company, Madison; W. Turpin, Roachdale Union Telephone Company, Roachdale; L. Nicely, Dayton; Joseph Heath, Oxford; Ezra Tripp, Boswell; F. W. Pardee, E. L. King, E. L. Draffen, J. J. Keane, F. R. Schaalck, F. A. Franklin, Chicago; J. R. Collins, Indianapolis; S. G. McMeen, Chicago; H. B. McMeal, TELEPHONY, Chicago; H. E. Babcock, TELEPHONY, Chicago; J. E. Leach, Cheneyville Telephone Company; John A. White, Electric Storage Battery Company, Chicago; D. C. Plumb, Chicago; F. L. McGillan, Valentine Company, Chicago; W. H. Graffis, *Sound Waves*, Chicago; S. D. Messener, Williamsport exchange; J. G. Thensen, American Electric and Telephone Company, Chicago; E. L. Hoffman, Sharpsville; G. H. Miller, Newark, O.; John A. Hayes, Sharpsville; G. S. Van Deusen, Michigan City; Theodore Weinshank, mechanical engineer, Chicago; C. H. Macklin, Swedish-American Telephone Company, Chicago; R. D. Fisher, Indiana correspondent *Electrical World and Engineer*, New York; W. H. Trimm, Chicago; John L. Osborn and J. H. Draper, Veedersburg; D. C. Shoaf, Wallace; W. A. Wright, Hillsboro; A. L. Tetu, Louisville, Ky.; A. E. Mailsbury, Francesville; Everett Harrold and D. B. Barnett, Flat Rock; C. H. Phelps, New Castle; W. H. Brown, New Market; Dr. J. W. Hedrick, Mulberry; E. E. Farley, Chicago; Henry A. Barnhart, Rochester; S. Y. Grove, Salina; L. E. Tokey, Markle; C. H. North, North Electrical Company, Cleveland; G. H. Miller, Miller Anchor Company, Norwalk, O.; John E. Yarling, secretary and general manager Peru Home Telephone Company, Peru; R. G. Kendrick, W. G. Tragel Electric Company, Toledo, O.; J. C. Eckhart, Eckhart Telephone Company, Buck Creek; W. W. Smythe, Jr., Fibre Conduit Company, Chicago; T. E. Hanaway, Monticello; Byron Stratton, Citizens' Telephone Company, Cambridge City; S. Hehnsing, Cambridge City; M. H. Moffitt, National Carbon Company, Cleveland, O.; E. A. Phillips, Toledo, O.; L. H. Griswold, Francis Beidler Company, Chicago; J. Lenahan, U. S. E. Company, Rochester, N. Y.; Carl Carpenter, Perrysville Telephone Company, Perrysville; U. L. Early, the S. Morrison Telephone Company, Greenfield; George H. Conker, the S. Morrison Telephone Company, Greenfield; M. P. Boone, Peru Home Telephone Company, Peru; W. B. Coffing, Fountain Telephone Company, Covington; L. D. Carpenter, New Carlisle; O. Rex, North Manchester Telephone Company, North Manchester; D. E. Miller, Flora Telephone Company, Flora; M. J. Nagle, New Augusta Independent Telephone Company, New Augusta; A. W. Crouch, American Conduit Company, Chicago; H. H. Bass, Lake Charles, Ia.; Frank B. Cook, Chicago; G. H. Lutz, Kellogg Switchboard and Supply Company, Chicago; J. J. Brown, Consolidated Telephone Company, Danville; A. D. Pike, Clint Hall, Tippecanoe Telephone Company, Romney; James Davis, Frankton Home Telephone Company; J. A. Wright, Williams-Abbott Electrical Company, Cleveland, O.; F. M. Maddox, Otterbein Telephone Company, Otterbein; D. B. Wick, North Electrical Company, Cleveland; L. G. Davis, Hoosier Telephone Company, Salem; LeRoy Patty, Union Telephone Company, Carmel; D. L. Thompson, Kirklin Telephone Company, Kirklin; C. E. Stimson, Toledo Home Telephone Company, Toledo, O.; L. H. Kratzen, Mulberry; John F. Dukes, Marson; Frank M. Boyd, Parke County Telephone Company, Rockville; Thomas Bromberg, Jr., Delaware and Madison County Telephone Company, Muncie; John C. Murray, International Telephone Manufacturing Company, Chicago; Robert J. Williamson, secretary and manager Montmorenci Telephone Company, Montmorenci; F. D. Rushing, Varney Electrical Supply Company, Indianapolis; R. E. Stone, Delaware and Madison County Telephone Company, Muncie; Charles S. Norton, Indianapolis; J. E. Switzer, Otterbein Telephone Company, Otterbein; J. Alex Navarre, Lindley River Company, Chicago; L. J. Burr, Anderson.

IMPORTANT DECISION.

Following the decision of the Appellate court establishing the validity of the Fisk patent, the Chicago Telephone Supply Company of Elkhart, Indiana, makes the following statement.

The United States Appellate Court for the district comprising the states of Illinois, Indiana and Wisconsin, has rendered a decision establishing the validity of the Fisk patent. This patent covers all forms of telephone switchboards on which the drops are restored automatically by the insertion of the plug into the spring jack. There has been a great deal of argument to the effect that the decision is wrong and that the judges were led by their lack of technical knowledge into the adoption of false logic; that when this case is tried in other districts a contrary decision will be rendered; that the two conflicting decisions will be reviewed by the United States Supreme court and the validity of the patent will not be sustained. We hope for the sake of the telephone world in general that events will transpire in accord with this idea, because a monopoly always has a baleful and hampering influence. Self-restoring drops are indispensable on up-to-date switchboards and it is not in the interests of purchasers that such a device should be controlled as a monopoly.

Unfortunately, the Court of Appeals is the court of last resort in its district. If it should decree that the law of gravitation was not operative the lower courts in the district would be bound by that decision in all their judgments. When the Fisk patent case comes up in other districts it may be that a contrary decision will be reached. We hope so. In the meantime all users of such apparatus are in danger of suits for infringement. To relieve our customers from anxiety and to protect users of Chicago apparatus from all danger we have secured a perpetual and non-revokable license from the owners of the Fisk patent, to manufacture and sell switchboards equipped with self-restoring drops under this all-inclusive patent. If, eventually, the courts decide the patent to be invalid, the license will lose value. If the courts finally uphold the patent in all districts then the license will be of inestimable value to users of switchboards. In the meantime users of Chicago apparatus are protected absolutely from danger of suits for infringement and no exchange can be thus free unless protected by such a license. All Chicago apparatus is backed by a guarantee which we often say is "as good as a government bond" and in taking out this license we have done so for the purpose of making the Chicago guarantee like the reputation of Caesar's wife, above suspicion.

The Johnstown (N. Y.) Telephone Company has put in operation its long distance connections obtained through its relation with the Johnstown-Pittsburg Long Distance Telephone Company. This connection gives Johnstown a great western outlet, not only in Pennsylvania, but in Ohio and Indiana as well.

DIGEST OF TELEPHONE PATENTS

Conducted by Edward E. Clement

757,884—Thermal cut-out. H. P. Clausen.

This is a heat coil for sneak current arresters, in which a thin sheet of solder is interposed between two sharp edged members which tend normally to produce a shearing action on the solder, and to shear it off as soon as it becomes slightly softened. The sharp edged members consist of an inner piston and a cylinder in which the same may slide. A thin sheet of solder is laid over one end of the cylinder and the sharp edges of the piston rest thereon. The projecting stem of the piston tends to force it in, and when the solder softens it is forced in, cutting through the solder.

In the figure herewith *f3* is the cylinder, carrying the heat coil *f5* at one end. *f8* is the piston or head having its sharp edges turned inward, and carried on the spindle *f*. The pressure on this piston is inward, so that when the sheet of solder *f10* is softened by a sneak current in the coil *f5* the edges of the piston will shear through it.

This patent is assigned to P. C. Burns and J. G. Ihmsen.

757,971—Thermal cut-out. M. Setter.

This is another heat-coil arrester of the same type as that above described, the only substantial difference between them being that Mr. Clausen shows a metal piston or cap, and Mr. Setter shows and claims a piston of insulation. In the figure *b8* is the piston of insulating material, which will not conduct away the heat from the coil, but will permit it to be concentrated on the solder *b10*. This solder is in sheet form laid over the open end of the cylinder *b1*, normally preventing the piston *b8* from telescoping into the cylinder. A slight softening of the solder is said to permit the piston and cylinder to act as punch and die, shearing out a ring of the softened metal, so that the piston passes into the cylinder. The mounting for this device comprises a post and spring, the former having an orifice that permits the spindle *b2* to pass freely, but stops the plug or piston *b8;* and the latter having its upper end taking into the groove in the head *b7*. Circuit is from the spring through the head *b7* to the coil *b5*, thence to the body of the cylinder *b1*, through the spindle *b2* and out. Telescoping of the members permits the spring to move over toward the post, breaking the circuit at a back contact.

This patent also belongs to Messrs. Burns and Ihmsen.

757,972—Thermal Cut-out. M. Setter.

The two forms of circuit breaker just referred to both work under compression strains. That is, the parts tend to collapse under spring pressure, but are prevented from so doing by the interposed sheet of solder. In the present instance the reverse is the case, the parts being under tension, and being prevented from separating by a connecting ring *b8* of solder. In the figure the entire structure from *b3* up to the head of *b* is unitary, comprising the grooved head *b*, a block of insulation, the sleeve surrounding it, the threaded stem within it, the heat coil *b4* upon the stem, and the bottom disk *b3*. The separable feature is all at the bottom. To the disk *b3* is hinged at *b5* the swinging disk *b2* carrying the headed boss or stud *b1*. The disk *b2* is normally turned up into the position shown and held there by the ring *b8* of solder. When the coil *b4* gets hot the parts *b2-b3* transmit the heat to the ring *b8*, which softens and lets the disk *b2* swing down. The device is thus broken into two swinging sections, which yield to the spring tension and permit the rupture of the circuit and its grounding on one side as usual.

Like the others, this patent is assigned to Burns and Ihmsen.

758,200—Telephone Climber's Seat. J. E. Bennett.

This invention requires no description. The figures are clear. The seat is on a horizontal strut carrying pointed rods *15* taking into the pole, and serving as bracket rods or struts. Single curved pointed clamps take around the pole; but as they extend only part way the grip does not seem as secure as it might be made. Mr. Bennett's address is Momence, Illinois.

759,981—Electric Cable. J. Frisch.

For some years engineers on both sides of the Atlantic have been working on the problem of reducing the electro-static capacity, or increasing the balancing inductance, of cables. In telegraphy as well as telephony it is important to minimize the retardation due to excessive capacity; and results have been obtained by Professor Pupin and others both here and abroad which justify the hope that high speed telegraphic transmission, if not telephonic transmission, will some day be possible over very long distances and through submarine or subterranean cables. The present invention aims to reduce electro-static capacity by means of increased air spaces, being especially applicable in cases where the points of contact between the conductor and the insulating material are reduced. The conducting wire or wires *a-a* are laid up spirally around an insulating core *b*, which has radial ribs and is itself twisted oppositely to the wires. A cord *d* is laid up between the wires, and has a greater diameter, the whole being then wrapped, if desired, with smaller cords, and covered with an outer wrapping or casing *c*. The wires are thus kept from touching the outer casing at all, and only touch the core at points on the edges of the ribs. Iron wires *f* may be twisted in with the core in order to increase the inductance.

760,143—Apparatus for Amplifying or Re-inforcing Telephone Currents. J. J. O'Connell.

This is a repeater system, in which not only are the telephone currents relayed in both directions without interference, but the original currents are not impeded in transmission. Briefly stated the scheme is to use the metallic circuit for receiving in the ordinary way, and to form thereon a phantom-circuit for transmitting. Thus in the figure herewith, the secondary of each induction coil *I* is grounded at its middle point, forming two coils which in series act as a choke coil to force incoming telephone currents to pass through the receiver branch *Y*, while transmitted currents due to the transmitter *T* pass over the two-line wires in parallel and through the two windings of the magnet *W* to earth at E^2. This is the relay magnet controlling the

microphone *Z*, which in turn sends current over the metallic circuit through the secondary winding *s*.

760,399—Selective Signal System. F. C. Penfield and O. Templin.

This is a selective party-line system of the B.-W.-C. type, in which the operator at central is provided with a series of keys corresponding to the stations on the line, and the signal at each station is connected to one side of line and a controlling relay is connected to the other side of line. This idea of ringing plus or minus over one side or the other of line originated, I believe, with Mr. Sabin, and its use with controlling relays was perfected by our hyphenated friends.

In magneto systems direct grounds may not be objectionable, but in common battery work condensers are necessary, and a peculiarity of the condenser is that it will not pass intermittent or pulsating current unchanged. Owing to this peculiarity the condenser has not been popular in selective work, but the present inventors claim to have discovered that a single impulse of the desired polarity may be sent through a relay and condenser to energize the former. Hence they are able to put ten stations on a line and do their selecting by merely sending plus or minus current to one side or other of the line, except with the last two stations, and with these ordinary alternating is employed. In the diagram herewith *L1* and *L2* or the line wires, extending through the keys *K1*, etc., at central, where the batteries *B1 and B2*, and the generators *G1*, *G2* and *G3* are provided. The last named produces alternating current, the other two generators produce pulsating current, and the batteries are relied upon for continuous current. Minus current over line wire *L2* energizes the relays *R-R* at stations *1* and *2*, for an instant, whereupon these relays pull up their armatures, closing circuit through the bells *B*, and also closing a shunt around the condensers *C*. This shunt being closed instantly, the armatures remain attracted, and if plus current has been put upon line *L1* the first bell *B* will ring; if minus current then the second bell will ring.

In the same manner any other station can be selected, the relays *R* responding pairs, and the bells responding in pairs, but the pairs being staggered, so to speak. The last two stations have the alternating current relays and bells, and the relay armatures work on a back contact. Hence these bells can only be rung when there is no current on the relay side of the line in each case; and a second condenser is also provided for the bell. For every current these relays respond and cut off the bells.

It goes without saying that all the connections of generators and batteries at central are made automatical by working the different keys which correspond to the various stations.

760,549—Plug and Spring Jack Switch. F. R. McBerty.

This is really a strip of springjacks, such as are used for multiple boards. It comprises a base plate of metal *k* carrying the front strip *f* of rubber, with the usual test thimbles *g* having integral tails extending back through the rear strip and being bent over at right angles for that purpose. The rear strip is built up of alternate insulation and conducting strips, the intermediate jacksprings and rubber slips being formed with projecting shoulders *c* to take around rectangular projections of rubber upon the base strip. Thus all the jacksprings and other parts are held in position by pressure, the upper strip of metal *C* being held down by screws *i* extending through into the base plate.

In order to prevent false contacts in the jack, the plug is provided with an insulated enlarged metal ring *p*, which is dead while the plug is in the jack.

760,568—Electric Indicator. E. Sadler.

This is an annunciator having a disk signal *F*, provided with white and dark stripes, the white stripes being ordinarily concealed, but showing through slots in the face plate *G* when the magnet *C* is energized. Each annunciator is restored to normal when another call comes in, in this way: The winding *A* and the winding *C* produce like poles at the upper and lower end of their cores; and the core *E* of magnet *C* carries the disk and turns upon pivots therewith. The magnets *A* of all the annunciators are connected in series so that when any of the push buttons at substations are pressed all the magnets *A* (which are restoring magnets) will be energized. The particular magnet C of the button pressed will also get current, and in that annunciator the core *E* will be repelled by core *B* and the signal will be displayed. In all idle annunciators only the magnet *A* will be attracted by that magnet to restore the disks to normal.

760,573—Telephone Exchange System. C. E. Scribner.

This is a common battery system of a type very different from the ordinary Bell system. A repeating coil for every line is employed, and a single conductor cord. Many systems of this general type were produced about fifteen years ago, when common battery was not as fashionable as it is now.

Each line is connected to the main battery *b* through the relay *a* and the winding *d'* of the repeating coil (which is also a relay) *d*. A resistance *c* is provided in the normal circuit, and the relay *a* is provided with a non-inductive shunt *a'*. The winding *d2* of the repeating coil is grounded on one side and is connected on the other to the single-contact-jacks *e*, *e'*. A portion of the winding *d2* is normally short-circuited through the armature and back contact of relay *a*.

Subscriber *A* calls by taking down his telephone, whereupon current from battery *b* flows in the line and energizes relay *a* and also (feebly) repeating coil relay *d*. The latter attracts the armature *d6* so that it touches the pivoted lever *d4*, closing the lamp circuit *4*. When the answering plug *g* is inserted current flows from battery *b* through the winding *d2*, and the armature *d6* is strongly attracted, so that it moves the lever *d4* away from the contact *d5*, onto the contact *d7*, breaking the lamp circuit and shunting the resistance *c*.

When the called subscriber answers after being rung, the relay *a* of his line breaks the shunt around the winding *d2*, but before that time this shunt permits sufficient current to pass from battery *b* through the cord circuit and lamp *h* to light the latter. When the shunt is broken the light goes out.

760,574—Electric Pole-Changer. C. E. Scribner.

This is a pole-changer of the Warner type, used for ringing subscribers in place of the ordinary generator. The essential features are a long lever *a* carried on a spring and worked by a magnet with a circuit breaker in series as usual, and a set of pivoted contact levers *b*, *c*, *d*, *e*. These levers are all spring-pressed inward, and an intermediate pivoted lever carrying an insulating distance piece *g* separates them a pre-determined distance and determines the moment of contact on either side. The battery connections are shown in the diagram herewith, the condenser *q* being connected in shunt around each break at the proper instant to prevent a spark. This patent, as well as the preceding one, is assigned to the Western Electric Company.

760,711—Automatic Telephone System. J. C. Slater.

This is a magnetically-controlled step-by-step clockwork switch selective apparatus. The invention is an improvement on that previously patented to Mr. Slater September 12, 1899, No. 632,759. There the system comprehended a series of telephones connected to a switchboard at central, with a selector switch for each subscriber with a series of contact points corresponding to the subscriber's telephone.

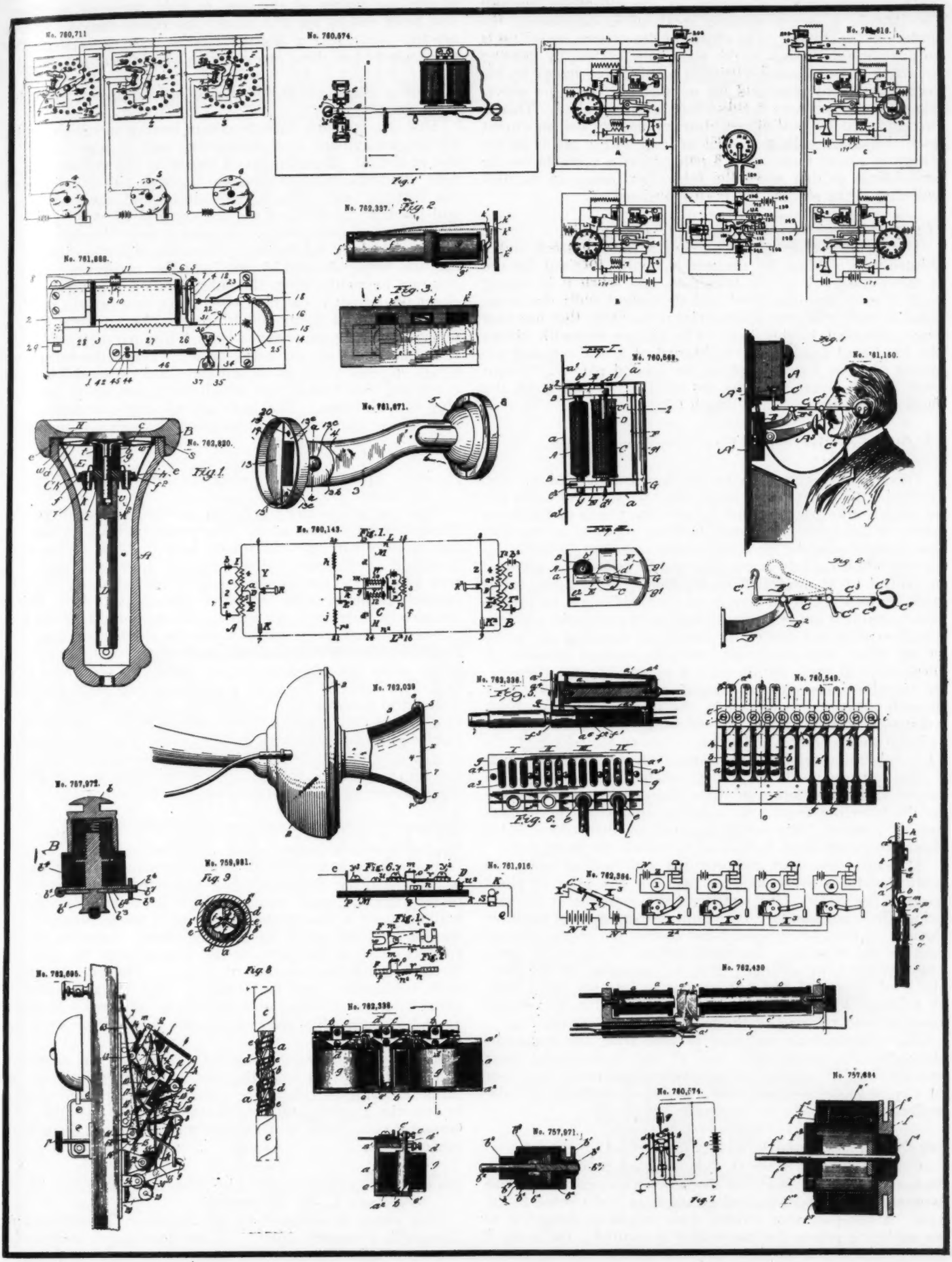

No. 760,711
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Fig. 1.
No. 762,337.
Fig. 2
Fig. 3.
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Fig. 1.
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Fig. 1
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Fig. 1.
No. 760,143.
Fig. 1.
Fig. 2.
No. 762,039.
No. 762,336.
Fig. 5.
No. 760,549.
No. 757,972.
Fig. 6.
No. 759,981.
Fig. 9
No. 761,916.
Fig. 6.
Fig. 1.
No. 762,384.
No. 762,430
Fig 8
No. 762,336.
No. 762,695.
No. 757,971.
No. 760,574.
Fig. 7
No. 757,684

Each selector switch is worked by the subscriber through the magnet *7* and a suitable break-wheel controlling the battery at his station. The object of the present invention is to provide for secrecy in the use of the system by causing an alarm to be sounded whenever a subscriber hangs up his receiver without removing his number pin from his selecting dial to disconnect a subscriber recently called. This is accomplished by putting an ordinary battery bell in circuit with the selector dials, so that as long as the pin is in the circuit is closed there, with a pair of extra contacts on the switchhook so that when the subscriber hangs up the bell will ring if the pin has not been pulled out.

761,150—Telephone Attachment. G. A. Cowgill.

This is a receiver holder having a fixed bracket and a jointed arm. When the receiver is swung forward for use it raises the hook of the telephone, and when it is swung back it goes past the pivot and its weight pulls the hook. This is really the most commercial proposition that has ever been presented in this line. The picture herewith shows the bracket *B* fixed to the backboard of a wall-set, and the dotted lines in Figure 2 show the jointed part *C3* thrown back and the lever tilted on the pivot *B'* to pull down the hook *A2* by means of the length *C'*.

761,616—Selective Party Line Telephone System. A. J. Springborn.

This is a division of a former application filed by Mr. Springborn April 3, 1903, serial No. 150,999. It constitutes an improvement over certain former inventions of the same party, which have been noted in these columns as the patents issued. In the present system it is sought to make the operation entirely automatic, and to relieve the operator at central of as much labor as possible. The figure herewith shows the central station in the middle and two party lines extending out from the spring jacks *9* to right and left. The invention lies entirely in means for selecting one party or the other, and comprises normally wound clock-work mechanism at each station with a release magnet therefor, an impulse transmitter at central, and a switch-hook lock at each substation governed by the selecting device. Each substation has a battery for selecting and a battery for talking, and the central office has a battery for selecting. In each substation selector the connections are made through a pair of rings inside the casing, adapted to be bridged by means of fingers depressed from the outside of the casing by the traveling arm of the selector, and when the circuits are so completed the connecting rod or link which holds down the switch-hook is released to unlock the latter.

At central the lines are provided with spring jacks and annunciators as usual, and the operator has pairs of plugs to unite the jacks. One feature of the invention is for severing the cord conductors within the operator's selective device, the cord being opened and battery put to line in connecting the selector. The said selector is mounted on a pivoted stand so arranged that by swinging it one way the cord is opened and battery put to line the other way. A solenoid and plunger hold the standard in its shifted position until released by the breaking of the circuit.

The receiver lock indicated is very frail, the apparatus throughout is complicated, and all the clock works must operate in perfect synchronism. If one mechanism gets out of step it spoils the operation. The system shown and described is not capable of commercial use.

761,671—Transmitter Arm. H. J. Guttman.

This is a pressed metal arm, formed up from blanks stamped out of the sheet. It comprises a two-part base with separate cheek pieces formed up together and riveted to the base; a two-part arm formed with bulges or flanges *6* to strengthen it where the transmitter is secured; and a cap *8* which screws on over the two halves of the cup formed up in the two halves of the arm to hold the same together. The pivot end of the arm blanks has raised flanges to form bearing faces, and a friction disc is inserted between the cheek pieces and these faces to give a tight bearing.

761,698—Telephone Switchboard Apparatus. J. L. McQuarrie.

This is a common battery system having metallic circuits for the subscribers' lines, but having only a single cord circuit at central. Each line has a repeating coil at central with four windings, two between the opposite sides of line and the battery, one between the battery and the line lamp, and the last one between the battery and the spring jacks. Both plugs of each cord are connected back through supervisory signals to the battery. Each line relay is directly in the line, being shunted by non-inductive resistance. In the diagram herewith, when the subscriber on the left calls he closes the circuit *1-2* at his switch-hook, and current flowing through relay *d* lights the lamp *e*. The operator inserts plug *g*, bringing supervisory lamp *k* into parallel with lamp *e*, and both of them are extinguished. When the subscriber hangs up relay *d* lets go its armature and extinguishes lamp *e*, leaving only *k* in circuit, which thereupon lights, and the plug is withdrawn. The jacks are all single contact jacks, and talking currents are propagated through the repeating coils.

761,852—Apparatus for Telephone Switchboard. C. E. Scribner.

This and the preceding patent are both assigned to the Western Electric Company. The present scheme is one for conveniently ringing subscribers' bells in lines of the type described in Scribner patent 563,073, June 30, 1896. In such systems the line signals are small incandescent lamps in ground branches with inductive resistances, these being completely obstructive for voice currents, but not so for low frequency ringing currents; hence the ringing currents are dissipated through the central office connections and instruments when the generator is put directly to line. To cure this, Mr. Scribner connects a repeating coil with one side to line and the other in a local circuit connected to the sleeve of the jacks of the line. All the repeating coils have a common return to the ringing generator, and the generator is connected through a ringing key to each cord. In the diagram *e* is the repeating coil, *i* is the generator, and *3* is the local circuit closed when a plug is inserted.

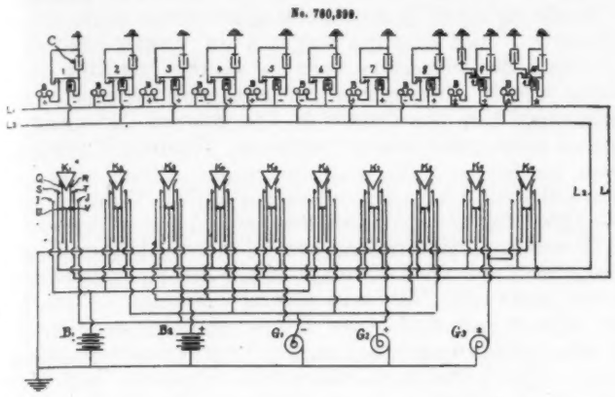
761,888—Telephone Selecting Device. W. M. James.

This is another step-by-step selective party line switch. A polarized magnet with a tilting armature like a ringer is employed, the armature being connected at one end to a pivoted drawing pawl which works in holes in a disc *14*. A holding pawl is also provided, having a projecting pin extending over the top of the drawing pawl. Impulses of one polarity draw in the pawl *12* and step around the disc *14*. It takes a different number of steps to close the circuit at each substation; and such closing may be accomplished either by a pin *34* lifting up a lever *35* to tilt it upon its pivot *37* and so push down the yoke *42* into the mercury cups *44*, or otherwise.

An impulse of reversed polarity throws over the armature and lifts both pawls from the disc, whereupon a spring returns the same to zero. The signaling circuit from central is over the ground, and the selector circuit is metallic, and central may be called up from any station without disturbing other stations.

761,916—Protective Device for Telephone Circuits. M. C. Rorty and G. K. Thompson.

This patent is assigned to the American Telephone and Telegraph Company (Bell). It has four pages of description and eight claims. The invention is a fuse having a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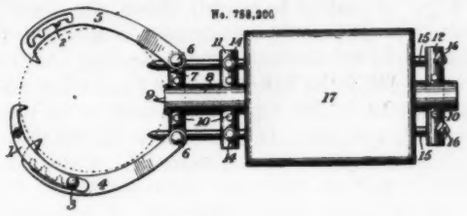
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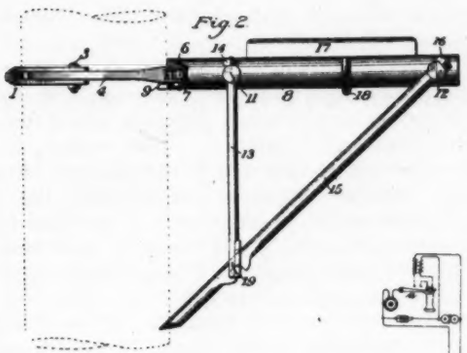
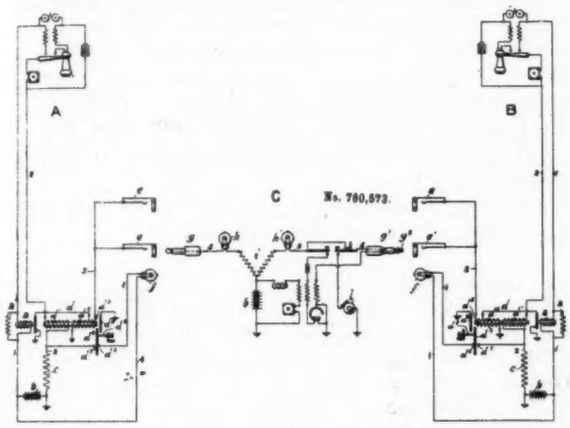


Fig 2


A
B
C
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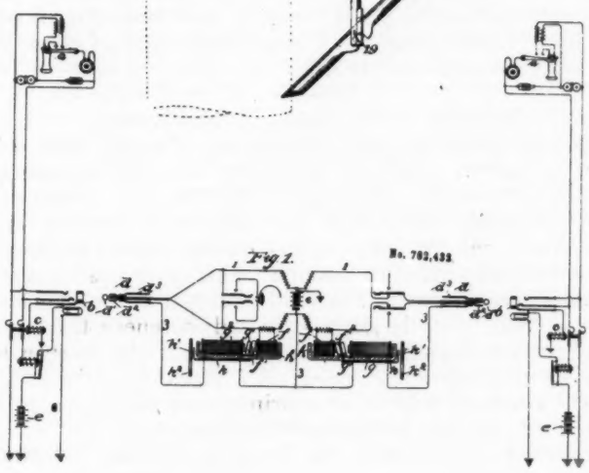
Fig 2.
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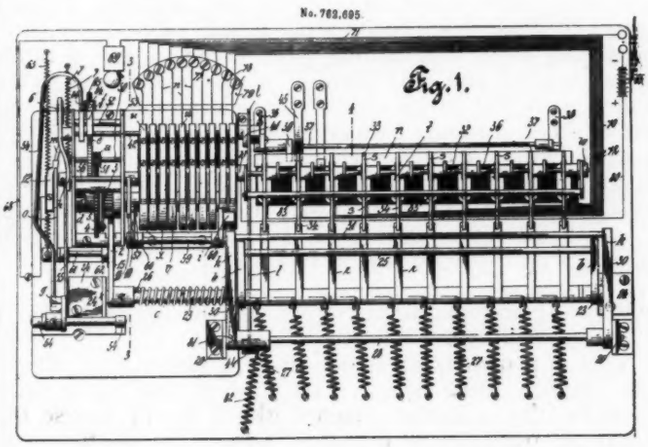
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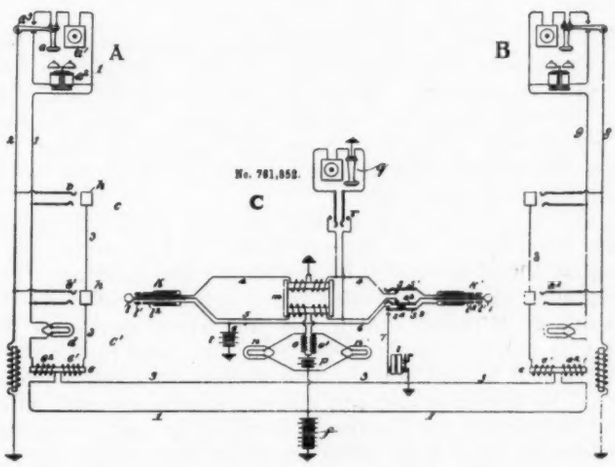
Fig. 1.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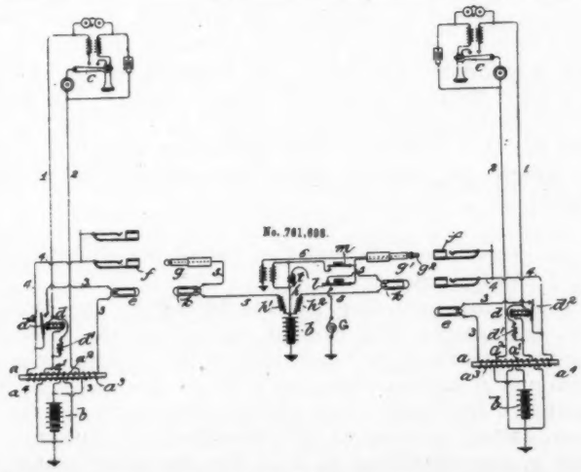
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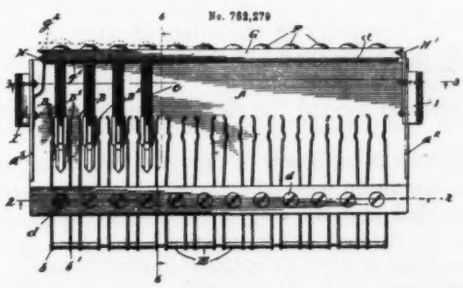

No. 762,279

spring tongue which is released when the fuse blows to close upon a fixed terminal and close an alarm circuit thereby. Figs. 1 and 2 herewith show the fuse comprising a mica strip *v*, and metal terminals *f* and *n*, the former having a bracket arm *m*, and the latter a spring tongue *n2* normally held up against the mica by the fuse wire connecting it to the bracket *m*. In Fig. 6 the fuse is in position between terminals *y* and *y2*. If the fuse *o* blows the tongue *n* will spring down against the terminal *q* of the circuit *Q* of the bell *S*.

762,039—Antiseptic Attachment for Telephone Mouthpieces. J. Freel.

Mr. Freel says that where a telephone is in common use its mouthpiece is a most favorable medium for the conveyance of pulmonary or other diseases which may be imparted by exhalation and inhalation. This sounds familiar, and it seems to us that somewhere in the past we have heard bitter language directed against our friends, the germs. The present guaranteed preventive for everything except filth on its own surface is a silk shield *4* held over the mouthpiece by a rubber ring *5*. I hope that some of these devices are successful and in use.

762,279—Telephone Lamp Jack. H. P. Clausen.

This is a strip of jacks comprising a metal base with turned up ends to which the lugs *I* are screwed for securing purposes. Along the rear edge of the base *A* is a split rubber strip holding the springs vertically, and clamped down by screws *d*. As the lamps are all in one common chamber each one is surrounded or wrapped with an opaque jacket *c*. The bulls-eyes or jewels *F* are all mounted in the one strip, which is held onto the jack strip by being notched at its ends to receive the springs *H'* and *H*, and it can be removed bodily by pushing back spring H. Each jewel is put in from the rear and held in by a well-known form of split retaining ring, with an interposed fiber washer.

The patent is assigned to the American Electric Telephone Company, Chicago.

762,336—Signaling Apparatus for Telephone Switchboards. F. R. McBerty and J. L. McQuarrie.

This is a mechanically self-restoring combined drop and jack, for use in common battery circuits. Inside the face plate are two shutters. When one moves it shows a signal; when the other moves it conceals the signal; when the first one moves back it again displays the signal, and when the second one moves back it again conceals the signal, so to remain until the next call.

In the figures the first shutter referred to is *a3*, carried by the armature *a'*; the second shutter is *a4*, carried on a spring *a5* which is worked by the plug when inserted. The operation is like this: When the magnet is energized the armature *a'* is pulled down, and the white marks on the shutter *a3* become visible through the openings in the shutter *a4*, which is also down. The shutter *a3* stays down as long as the line is in use and current is flowing; and when a plug is inserted the shutter *a4* is raised so that it conceals the white marks. Now when the subscriber hangs up, the shutter *a3* goes up again and again its marks become visible through the openings in the other shutter, for clearing out. When the plug is pulled out the lower shutter springs down, again concealing the signal. The first call shows three marks, and the second for clearing out shows only two (see Fig. 6).

This patent is assigned to the Western Electric Company, and the invention embodies a very clever conception. It may be added that the claims cover it broadly.

762,337—Signal for Telephone Switchboard. F. R. McBerty and J. L. McQuarrie.

This is another common battery self-restoring signal of the shutter type, with a second shutter to conceal the first; but the second shutter in this case is worked by a magnet.

In the figure *f* is the line magnet which pulls down the armature *f'* and lifts the target *k'* in front of the opening *k4* when the subscriber calls; *g* is the restoring magnet, whose circuit is completed when a plug is inserted in the jack, to pull up the shutter *k2* and conceal the tarket *k'*.

This patent also is assigned to the Western Electric Company.

762,338—Relay. F. R. McBerty.

This also is assigned to the Western Electric Company, being for a unit strip of relays on the same principle as those gotten out by W. W. Dean several years ago. Dean took a bar of cast iron and bored a row of holes in it, in which he put electro-magnets, hanging their armatures along the front edge of the strip, which thus became a sort of magnetic common return for all of them. Mr. McBerty takes a strip of wrought iron, rolled with flanges, and sets up a row of coils between the flanges, balancing their movable cores inside the coils on the lower flange so that when magnetized they will be attracted to the upper flange. Contacts for the cores are mounted along on, but insulated from, the upper flange, and each core at its upper end carries an adjustable co-operating contact.

In the figures, a face view and a section of this arrangement are shown, which are self explanatory.

762,364—Telephone Call Instrument. E. W. E. Tompson.

Mr. Tompson is dead, and nothing but good should, therefore, properly be spoken of his achievements. It is permissible to say, however, that this invention will never revolutionize telephone practice. It comprises the usual features of a step-by-step selective switch for party lines, and has the following features: A normally open local circuit with battery and call bell at each station; a circuit closer to close this circuit, a pneumatic valve, a weight, a propelling lever, a propelling pawl, a check pawl, a ratchet wheel rotated and held thereby, a disc with pins sticking out to work the circuit closer aforesaid at the proper number of steps, a strong battery for the main line to call with, a weak battery for the telephones, keys for the batteries, a magnet at each station to work the selector, and a lot of details. In other words the usual features are put together in the usual way. It is a great pity that Mr. Tompson's widow wasted her money on this patent.

762,430—Electromagnetic Signal. F. R. McBerty and F. H. Loveridge.

This is a curious arrangement of a target controlled by one magnet, being balanced on a pivot, and an armature controlled by a second magnet, which by its weight balances or overbalances the first target. In the figure the target *e* is carried by armature *a2* which is pivoted in the notch in strip *c'*. This armature is normally attracted by the magnet *a* to conceal the target, and must be released to permit the latter to drop down and become visible. The second armature *b2* is separately pivoted and is controlled by the magnet *b*. If it is back it rests against the armature *a2* and by its weight prevents the latter from tilting over to show the signal.

762,432—Supervisory Signal for Telephone Switchboards. J. L. McQuarrie.

This and the preceding patents belong to the Western Electric Company. The present one covers the system of connections for the signal described in the preceding patent. The magnet *f*, corresponding to *a* of the previous patent is connected in the cord circuit and receives current from the common battery as long as the subscribers are talking; the magnet *g*, corresponding to *b* of the preceding patent has its circuit *3* closed when a plug is in a jack. As long as the

plug is in the jack, therefore, the magnet *f* is free to display its signal or not according to the condition of the line; but when the plugs are idle the armatures *g'* lock the signals so they will not show.

762,820—Electric Telephone. E. Gundlach.

In patent No. 751,501, dated February 9, and digested in March, Mr. Gundlach described a telephone with a diaphragm put under strain mechanically, by means of a flanged washer. In the present case he uses the same sort of a washer on the inside of the diaphragm, in a receiver. The patent is assigned to the American Telephone and Telegraph Company (Bell) and was solicited by Thomas G. Lockwood, all of which means that the invention is of no value. The figure herewith is self explanatory, the diaphragm being shown at *H*, and the coil *g* acting upon it through the medium of the little armature *b*; *c* is the tension ring, pressing outward against the pull of the magnet.

762,695, Signaling Apparatus—Ernest A. Faller.

The invention in this case is a transmitter for subscribers' stations in automatic telephone systems, its function being to send variable signals determined by the subscriber in setting the device. Variable signaling instruments are not new, nor are several of the specific features herein described; other apparatus previously in use, the principal one being but this apparatus has certain features distinguishing it from the means intended to prevent the misuse of the instrument or the sending of an incorrect signal.

Generally speaking, this apparatus comprises a box or casing having a front panel upon the inside of which the operating parts are all mounted. Push buttons project through this panel and are accessible to the subscriber upon the front thereof. The mere pushing of any one of these buttons provides the motive power for the sending of the signal, selects and sends one of the variety of signals the apparatus is capable of transmitting, and locks the mechanism against duplicate use or against the sending of a second signal until after the first has been sent and the apparatus restored to normal condition.

Figure 1 herewith is an inside view of the front panel of the casing, showing the clockwork mechanism and the set of break wheels with their springs and terminals, at the left of the figure; the push levers and circuit closers, contacts therefor, the common release lever and the common locking lever, all along the right half of the figure. Figure 2 is an end view of the same apparatus, looking from the left hand end of Figure 1.

The operation is like this: When any button is pressed in the main spring *c* is wound by turning the spindle *23*, the circuit is closed at *83* through one of the wires *72*, to the corresponding spring *u* in the break wheel set, turns back the wheels, releases the clockwork and at the same time throws down a dog *i* which locks the levers *k*, the cross-bar *31* connecting these levers, then locking all the push buttons from being pressed. When the signal has been sent, detents are removed and the various levers thrown back to their normal positions.

For the purposes of this operation the apparatus obviously can be divided into two distinct groups of mechanism, one group of which is of a collective nature and the other of a selective nature.

The collective group comprises mechanism which must be made operative each time a signal is to be sent and is common to all the sets of selective devices, being affected each time a key is fully operated. The selective group comprises means whereby either of a plurality of signals may be chosen by the operator depressing the proper key. The collective group embraces the clock-wheel train *a*, winding lever *b*, mainspring *c*, character-wheel shaft *d*, escapement *e-f*, escapement detent *g*, intermediate locking-lever *h*, key-locking lever *i*, key-lock or locking-frame *k*, connecting-rod *l*, actuating or collective contact-lever *m*, switch-controlling bar *n*, and cut-out lever *o*.

The selective group of the instrument embraces the following mechanism: signaling-keys *p*, contained in a suitable housing *q*, intermediate signaling levers *r*, loosely fulcrumed on the shaft of the winding-lever *b*; switch levers *s*, contacts *t*, contact-springs *u*, adapted to engage sections *v* of the character-wheel *x*. The contacts *t* are individually connected to their contact-springs *u*—that is, the right-hand contact *t* is connected to the right-hand spring *u*, etc. The housing *w* of the switch-levers *s* is in metallic connection with the line *80*, as is also cutout *o* with the other end.

THE TELEPHONE SITUATION AT EVANSVILLE.

The telephone situation at Evansville, Ind., daily grows more interesting. The Home Telephone Company, recently organized, has applied to the board of public works for a franchise and agrees to pay the city $4,000 annually for thirty years and suggests allowing this money to remain in the hands of the telephone company at three per cent interest, to be applied on the purchase price of the exchange by the city at any five-year period after the first ten years. Otherwise the city has the right to purchase the plant by paying one-half of the price stipulated in cash and the remainder in four annual installments. The company agrees to file a bond of $10,000 to have the plant completed and in operation within one year after granting of the franchise. Wires within the fire limits are to be put in conduits and cables are to be used whenever possible. The company also agrees not to assign to any company now in the field, or that shall be allowed to operate in the city, the franchise or contract granted to it by the city. The charges asked are as follows: Business telephones, $4; residence, $2; party line, $1. After 6,000 subscribers are secured the company is given the right to increase the price twenty-five cents for each additional thousand.

No sooner had the Home company applied for a franchise than the Citizens' Telephone Company, which had been granted a franchise by the board of works, sent a communication to the council withdrawing its application, stating that it did not wish a franchise if, in good faith, any other company offered better terms to the city.

It has recently developed that the plan by which the Citizens' Telephone Company is to pay the debts of the old municipal company is through the sale of the plans of the latter company, which are claimed to be worth $8,000 to any company coming into the field. But this plan is being interfered with by a stockholder, who has brought suit for a receiver for the municipal telephone company, alleging that the official representatives of Evansville have made a secret agreement with persons who have organized a telephone company, whereby the latter are to make good the losses of the municipal company in express consideration of a franchise for the new company. In consequence of public agitation over the three companies recently organized, each clamoring for a franchise, a resolution was introduced in the city council providing that no action be taken on the telephone question until the court's decision relating to the Cumberland company's rights (now on appeal) is handed down. The passage of this resolution must be removed before the franchise can be let to advantage. This is taken to mean that the franchise will go to the highest bidder.

A suit has been brought against the Cumberland Telephone Company at Evansville, Ind., to recover $10,000 damages on account of the death of Mabel Meckel while working at the company's switchboard during a severe electric storm. The question raised by the action is regarded of vital interest by both telephone men and telephone operators.

XUM

The Telephone in Railway Work

B. A. KAISER

B. A. KAISER.

With the increased growth of passenger and freight traffic and the necessary complicated methods of handling numberless trains, comes the necessity for quick transmission of orders regarding the receiving and dispatching of same. No one thing has made this more possible, or has reduced the danger of accident to a minimum, so much as the perfected telephone system now in use on many of the larger railroads. In no one direction has there been more advancement than in the use of the telephone, and to-day it has passed the point of a commodity and is almost an absolute necessity whenever there is a need of a facility for the immediate transmission of orders.

Its first use in connection with railroads was simply to accommodate the public, giving the hour of departure and arrival of trains, only being associated with the commercial end of the business. But to-day it not only enters into the commercial field but plays an important part in the operating department.

Before it was possible for a railroad company to install for its own use a private branch exchange, it was necessary for it to procure from a local company a required amount of exchange service, giving it practically none and certainly very slow intercommunication between its own offices, all of its intercommunicating calls being handled by the public exchange operator who could show no partiality in the handling of her traffic. To-day with modern equipment and by the use of its own private branch exchange, the railroad company can secure from its own system, local long distance and intercommunicating calls between its several offices.

It is an interesting matter to note the growth of the telephone upon one of the modern railroads from which we have been able to secure figures of unquestionable accuracy. On February 1, 1894, the New York, New Haven & Hartford Railroad Company used in the conduct of its business at New Haven, Connecticut, three direct exchange telephones and one circuit known as "yard circuit" with six telephones thereon. Grand Central Station had but one telephone and this was used by the officials, as well as used for reservation of parlor and sleeping cars. Harlem River Station, a point which handled up to 2,000 cars in twenty-four hours, had but one telephone direct to the exchange and a short line connecting eight of the most important points throughout the yard. Piers 18, 19 and 36, North River, had direct exchange service. Pier 50, East River, had one telephone with direct exchange service. Providence, Rhode Island, had a few direct exchange service lines and three short lines through the yards. New London, Connecticut, had one telephone with exchange service at its freight house. Boston had a few exchange lines in the Old Park Square Station and the South Boston freight terminals were practically in the same condition regarding telephone service.

With this inadequate telephone service at the various points on the New York, New Haven & Hartford Railroad, it was necessary for the railroad company to employ messengers at the various points to carry messages to the different departments, as well as run to and fro with car records and telegrams through its numerous yards and offices, all of which caused some delay in switching and movements of train as well as endangering of lives.

On February 1, 1904, this railroad company had felt the necessity of increased facilities and had installed on its system 1,500 telephones, besides a number of private branch exchanges, and also its own metallic circuits of communication between its various cities. These telephones are being put to the following uses:

Direct communication with the public from the different offices of the railroad company.

Immediate communication between the officials, heads of departments and the numerous other employes of the railroad company.

By the use of its own private branch exchange, matters of a confidential nature can be talked about with perfect privacy, as the circuits used for this do not extend beyond its own building, saving unlimited correspondence, which heretofore has always been necessary.

Its use in the operating department for direct and immediate communication between the station master, yard master, towers and switch cabins, in connection with the making up of trains, handling of car numbers and saving the time of freight conductors in many ways in the making up of trains.

It also gives the station and yard masters quick communication with the engine house and enables them to secure additional power when needed, all of which saves money and time for the railroad company.

Blind sidings being operated without telephones were a menace to life and limb and often resulted in the destruction of railroad property, it being almost impossible to arrange signals as to the movement of trains upon this class of track. With the use of the telephone, danger of collision is reduced to a minimum, it being possible to notify the proper parties as to the movements to be made.

At large terminals, such as Boston, Providence, New London, New Haven and Harlem River, where there are thousands of movements each day, it simply is invaluable, because by no other method could the trains be handled so easily, so safely or with so much rapidity as by the use of the telephone.

It enables the one in charge to be in immediate connection with every point of his terminal and orders are given and executed with a rapidity that could not be done by any other method.

It has been proven that by generously supplying all offices with telephones, the railroad company is able to save men, as the clerks do not have any excuse to leave their work for any information they may need from some other office or yard.

Foremen are able to take charge of more work by its use, while yard masters, road masters and dispatchers claim they could not do the work which they are at times called upon to do without the telephone.

There is no railroad more able to handle a disaster than the one equipped with metallic circuits giving immediate communication from the location of the accident to its proper department at either end of the line. It is only necessary to equip each train with a portable telephone and the means of connecting it to its lines along its right-of-way, to give such information to its officials as will enable them to issue instructions governing the entire situation. The in-

[Paper read by B. A. Kaiser, New York, at the twenty-third annual convention of the Association of Railway Telegraph Superintendents at Indianapolis, Indiana, June 15 and 16.]

formation given over said line does not go through a public exchange and can be treated with such privacy as the official of the railroad company may see fit.

When equipped with telephones which have access to the general telephone system, the railroad company may establish communication between any of its offices over the commercial lines of the telephone company, should service over their telegraph lines become impaired by accident, storm, etc.

With the active competition in the railroad field at the present day and the many inducements offered by the various railroads to secure the shipment of freight over their lines, the necessity of quick communication between the shipper and the freight department is keenly felt by the railroad companies.

It is conceded that a large portion of the business is transacted by personal solicitation, but there still remains a vast amount which must come through the channel afforded by the railroad telephone system. The busy shipper must have all such information as to the most direct route, rates for different classes of freight, arrival and departure of trains, time required en route, also information as to the so-called "hold-overs" and re-shipment of cars. All this information can be given quickly with adequate telephone facilities.

Establishment of long-distance lines between terminals has materially reduced the traveling of all officials and employes of the railroad company, as these lines can be used during the day for important matters and at night for the checking up and correction of the many differences liable to occur on a large system. The long line also makes it possible to notify the offices at the destination of freight trains, the contents of cars, their final destination and many other details which overburden the telegraph circuits and create a great loss of time in awaiting replies.

To demonstrate the amount of telephone traffic of the New York, New Haven & Hartford Railroad during the year 1903 from its ten private branch exchanges, five being located at its piers and terminals at New York, one at New Haven, Connecticut, one at New London, Connecticut, one at Providence, Rhode Island, and two at Boston, Massachusetts, over 6,000,000 connections were established, this record being obtained by peg count taken the tenth day of each month and used as a comparative statement of the daily business. Over the long line of this company between New York, New Haven, Providence and Boston, the records show that about 7,000 connections were established each month between the hours of eight a. m. and six p. m.

In concluding will submit the following week day number of train movements made at the Boston Terminal Station:

Regular trains	838
Drafts to and from storage yards	387
Light engines to and from engine houses	367
Total movements to and from terminal	1,592

The above figures show the work that is actually being done by the use of the telephone.

WIRELESS TELEPHONY AT THE WORLD'S FAIR

For some inexplicable reason an epoch-making novelty at the St. Louis exposition that promises to rival the much-heralded air-ship competition has been almost entirely overlooked. Prof. Goldsborough, chief of the department of electricity, has quietly prepared a wireless telephone exhibition that will give the blase, wonder-ignoring American sight-seer a very agreeable shock of surprise. The telephone, then in its first stages of development, made memorable the centennial exhibition in 1876. If the air-ship competition materializes it will have to share with the "Noisy, Noiseless Court" the historic honors at St. Louis.

In the quadrangle, or court, formed by the four walls of the Palace of Electricity, the visitor may experience the sensation of hearing sounds at a distance, without any visible medium of communication. Going into the court one hears no other sounds than the near-by buzz of the throng and hum of moving machinery. To all intents and purposes the court is literally noiseless, yet the air is simply ringing with the music of phonographs in distant booths. The visitor is simply mystified on putting to his ear a pair of ear-pieces resembling the watch-case receivers that are worn by the telephone girl during her switchboard duties. The weird sounds that become audible are as disconcerting to the twentieth century man accustomed to talking machines and long distance telephones as were Stanley's electric shocks to the aborigines of Africa.

H. R. Hutchinson, who has been experimenting for several years along the line of wireless telephony, has now perfected his apparatus to such an extent as to make it serviceable over considerable distances, though yet at considerably less than a mile. When it is remembered that the first telephone circuit was only a few yards long, and the radius of the first wireless telegraphy transmission was circumscribed by the walls of a laboratory, the present limitations of wireless telephony are really not significant.

The World's Fair transmitting or sending station is located at Block 23, Palace of Electricity. It consists of a large graphophone and one of Mr. Hutchinson's heavy current transmitters. This transmitter is in itself a marvel, as it operates with a current of fifteen amperes, which would, of course, destroy an ordinary carbon transmitter. Such a heavy current necessarily generates considerable heat, so that provisions for water-cooling the apparatus are necessary. Connected to the transmitter is a large coil buried in the ground of the court. The receivers consist of two ordinary watch-case telephone receivers, attached to conducting spring supports, which pass through handles, terminating in an attuned receiving coil, about a foot in diameter, but about two inches in width and very light, so that it can be held with ease by means of the handle provided. This coil responds to the invisible electric radiations emanating from the transmitting apparatus, inducing similar electric pulses in the ear receivers, thus reproducing the exact sounds.

FIRE DAMAGES VOUGHT-BERGER COMPANY'S PLANT.

Late Saturday night, June 4, fire was discovered in the main factory building of the Vought-Berger Company's plant at La Crosse, Wis. Before the flames were extinguished the fire and heat had ruined or scorched by far the greater portion of the work in process in the telephone and switchboard departments and in the finishing rooms, entailing a loss of nearly $10,000. Work in process in the machine shops, wood working plant, plating and buffing departments was undamaged. The buildings remained intact. The machinery, tools, dies and jigs, and also raw material and reserve stock (kept in separate and fireproof building) were in no way injured. No salvage whatsoever will be attempted, as the company will not allow its reputation to be even slightly impaired for the difference of the few thousand dollars involved.

Fortunately, the company was on the verge of making important improvements and enlargements, to better and more promptly handle the unprecedented amount of business that has been coming to it and these fully matured plans are now being carried out. The greatest loss and inconvenience to the company is in the fact that the fire came in the midst of the busy season. The firm wishes to state, however, that every endeavor will be put forth to shorten the loss of time, extra workmen will be put on and extra shifts will be worked, nothing will be slighted, and no damaged goods will be shipped to any of its customers.

Independent Long Distance Service

M. C. BARRY

THERE seems to be no longer any doubt that the numerous Independent telephone systems of the United States will, within the year, be connected by a long-distance system extending from the Atlantic seaboard to Kansas City and intermediate western points in competition with the American Telephone and Telegraph Company. Much has appeared in print of late regarding the recent tour of investigation among the big Independent telephone exchanges of the west, which was made by a number of representatives of the leading Independent systems throughout the country. Rumors of a gigantic Independent merger, backed by Standard Oil capital, have since been rife, but this has been officially denied and branded as a report emanating from the Bell camp, invented to throw discredit, if possible, on the new movement, but, failing of its purpose, now that the facts are known. It is quite possible, however, that while the half-score companies concerned may not amalgamate into one company, there will be a parent company which will control the subsidiary companies to a very large degree. Some such plan as this will be necessary in order that the undertaking shall be successful and that it may be directed to the best advantage.

The various companies will continue the work of development for several years, when the federation will be made still closer, it is said, and a trans-continental Independent long-distance system perfected that will be superior in every respect to that of the Bell company. The promotors of this gigantic enterprise have unlimited capital at their command; they are men of brains, energy and determination and practically nothing stands in the way of the realization of their plans.

The inspecting party above referred to was composed of J. B. Splane of Pittsburg, president of the Pittsburg and Allegheny Telephone Company; S. H. Brown, vice-president and general manager of the same company; H. B. Beatty, Senator William Flinn, Senator John A. Weller, Robert C. Hall, D. P. Reighard, Dr. Roger Williams, H. M. Hall, T. G. Davis, G. T. Braden, H. M. Nichols of Oil City, Pennsylvania, John V. Ritts and T. P. Mifflin, both of Butler, Pennsylvania. From Cleveland the party went to Toledo, thence in turn to Grand Rapids, Chicago, Kansas City, St. Louis, Louisville, Indianapolis, Dayton and Columbus.

At St. Louis a conference of Independent operators was held, which was attended by the following: James B. Hoge, Cleveland, Ohio; J. A. Armstrong, A. L. Tetu and Colonel J. D. Powers, Louisville, Kentucky; B. B. Sale, Indianapolis, Indiana; James S. Brailey, Jr., Toledo, Ohio, director of the Home Telephone Company, Kansas City, Missouri; J. G. Splane, president, and R. C. Hall, D. P. Reighard, William Flinn, John S. Weller, J. T. Braden, D. R. Williams, J. V. Wibbs, T. T. Misslin, John A. Howard, H. M. Nichols, H. B. Beatty, directors, and S. H. Brown, manager, Pittsburg and Allegheny Telephone Company; Alfred Stromberg, Chicago; C. Marquard Forster, president, W. Roy McCanne, secretary, and W. Linton Reber, general manager, Kinloch Telephone Company, St. Louis, and the following directors: Rolla Wells, Breckenridge Jones, William S. Nolker, E. H. Benoist, W. L. Benoist, Philip Scanlan and M. H. Clapp. At this meeting a plan of organization and procedure was agreed upon, practically as stated above.

Knowing that a detailed statement from an official source would be of interest to its readers TELEPHONY has secured an outline of the proposed extension of the long-distance service from J. G. Splane, president of the Pittsburg and Allegheny Telephone Company, who says:

"The companies that are working together to build a long-distance system to compete with the American Bell system are: The Pittsburg and Allegheny Telephone Company, which covers western Pennsylvania; the United States Telephone Company, which covers the entire state of Ohio; the New Long Distance Telephone Company, which covers Indiana and laps over into Illinois; the Long Distance Telephone Company of Kentucky; the Kinloch Long Distance Telephone Company of Missouri, one of the strongest Independent lines in the country, and the Kansas Long Distance Telephone Company of Kansas. This will be supplemented by a concern organized in Illinois.

"A representative from each of these corporations comprises a committee which will formulate plans of operations. These have not been completed. The local business will be handled by each local company as it is at present. The long-distance system will eventually be controlled by one comprehensive company. The tendency will be toward cheapening the long-distance rates, and toward improving the service. The companies referred to are figuring on a great deal of building, and much of the extension is under way."

Mr. Splane was questioned about how the new organization will be financed, and was asked whether it were true, as reported in newspapers, that Standard Oil men were backing the enterprise. Mr. Splane said:

"Whatever capital is required to carry on the enterprise will be forthcoming. Hence we do not need to exploit our enterprise by using the name of any company or any group of financiers to sell our stock. We have no stock for sale. Local capital in each of the states mentioned will take every share of stock or bonds issued. The development in St. Louis, Indianapolis, Toledo, Grand Rapids, Louisville, Kansas City and other western cities is greater than that of the Bell system, and the westerners believe in the telephone because local capital is invested."

Mr. Splane showed a number of maps on which the rates of the long-distance system has been completed, are under construction or have been projected. This map showed that a line is being built from Pittsburg to Youngstown, Ohio, and thence to Cleveland. Another is under construction to Wheeling, West Virginia. This will be part of the main route between Pittsburg, St. Louis and Kansas City. The same line is also being extended east to Baltimore, and another branch is being extended to Philadelphia. A line is being built from Chicago to Elkhart, Indiana, and the Illinois Telephone and Telegraph Company is building its line from Chicago to St. Louis. This line will also be extended to Kansas City. The development will be extended to Wichita, Kansas, and into the Indian Territory and Oklahoma, and before long will be connected with the system in Texas. Mr. Splane said:

"The easterners who took the trip west were surprised at the telephone extension. Each plant has been built by local capital, and nearly all are paying dividends, and each company carries a comfortable surplus. Many of the lines

began taking business too low, but the contracts are being adjusted. Texas has more telephones per capita than any state in the Union. There twenty per cent of the population are telephone subscribers. This must mean almost one telephone to every household.

"People in the east are more conservative than the citizens of the west. Westerners would not put up with the annoyances, inconveniences or arrogance of corporations as we do in the east. This is why the telephone system is so much greater in the west than in the east."

An expert engineer, it is said, has been secured to go over all the properties of the Independent long-distance companies for the purpose of making a thorough investigation and pointing out such changes in the physical conditions and management as would be advantageous. He will make a report to the executive committee of the companies so that all may have the advantage of his work. The object is to secure a uniform system of doing business, so that should the lines be united there will be no difficulty in the operation.

At the St. Louis meeting of the inspection party, the red-white-and-blue shield used by the United States Telephone Company of Cleveland was adopted as the trade mark and emblem of all the long-distance Independent companies. Secretary Hoge has sent copies of the shield to all the companies that may unite under traffic arrangements.

The various companies will interchange business and reduce long-distance rates. This agreement makes possible long-distance service over Independent wires from Cleveland to Buffalo and Albany, Philadelphia, Wheeling, Chicago, Kansas City and through to Colorado and Texas. It is the most important agreement yet made by the Independent managers for the extension and development of business. It is in no sense a combination, but is an agreement for co-operation among men who are jointly interested in all the developments.

To make this agreement operative the United States Telephone Company, which owns more than one-half the long-distance mileage represented in the conference, will have to build some extensions that will connect all the systems in the co-operative association. A forty-mile extension has been constructed from Dayton, Ohio, to Richmond, Indiana, that gives the company a connection through to St. Louis. Another extension of about the same length will be built from Dennison to Cadiz and to the Ohio river, giving an additional and better connection through to Wheeling and the coal territory there. A small gap between Erie and Buffalo will be filled and will give a connection to Albany and Philadelphia, while another gap from the state line west of Toledo to South Bend, Indiana, will be constructed giving a through wire to Chicago.

It is the intention of the Pittsburg and Allegheny company to push the improvements and extensions now under way, which are expected to cost $500,000, and to spend $500,000 in addition to that to make possible long-distance connections.

Chicago has Independent lines projected to Milwaukee, St. Paul and Minneapolis, and others west of Omaha, so the Chicago connection will be one of the best made. A large business over the St. Louis wire is expected during the exposition. St. Louis has a wire through to Kansas City and others will be built to the southwest, though the Kansas City and Colorado Springs wire leads down to Texas.

The Interstate Telephone and Telegraph Company (Independent), which operates principally in northern Illinois, has placed the order for material for the construction of a toll line from Aurora to the city limits of Chicago. Although no contract has been drawn, it is understood that when this line is completed it will be met in Chicago by the Illinois Tunnel Company and connected to the automatic system. Although the Interstate company was not included in the consolidation of the Independent companies above mentioned, it is likely that some arrangement will be made for the use of its proposed line into Chicago.

It is stated that the headquarters of this new trans-continental Independent long-distance company will be in Chicago, and that it will have more than 1,000,000 telephones connected.

THE ORIGINAL TELEPHONE CIRCULAR.

Below is printed the wording of the first circular issued for telephone business. The original is in the possession of T. C. Martin, editor of the *Electrical World and Engineer*:

The proprietors of the telephone, the invention of Alexander Graham Bell, for which patents have been issued by the United States and Great Britain, are now prepared to furnish telephones for the transmission of articulate speech through instruments not more than twenty miles apart. Conversation can easily be carried on after slight practice with the occasional repetition of a word or sentence. On first listening to the telephone, though the sound is perfectly audible, the articulation seems to be indistinct, but after a few trials the ear becomes accustomed to the peculiar sound and finds little difficulty in understanding the words.

The telephone should be set in a quiet place, where there is no noise which would interrupt ordinary conversation.

TELEPHONIC ADVANTAGES.

The advantages of the telephone over the telegraph for local business are:

1. That no skilled operator is required, but direct communication may be had by speech without the intervention of a third person.

2. That communication is much more rapid, the average number of words transmitted a minute by Morse Sounder being from 15 to 20, by telephone from 1 to 200.

3. That no expense is required either for its operation, maintenance or repair. It needs no battery, and has no complicated machinery. It is unsurpassed for economy and simplicity.

The terms of leasing two telephones for social purposes connecting a dwelling house with any other building will be $20 a year, for business purposes $40 a year, payable semi-annually in advance, with the cost of expressage from Boston, New York, Cincinnati, Chicago, St. Louis or San Francisco. The instruments will be kept in good working order by the lessors free of expense, except from injuries resulting from great carelessness.

Several telephones can be placed on the same line at an additional rental for each instrument, but the use of more than two on the same line where privacy is required is not advised. Any person within ordinary hearing distance can hear the voice calling through the telephone. If a louder call is required, one can be furnished for $5.

COST OF CONSTRUCTION.

Telephone lines will be constructed by the proprietor if desired. The price will vary from $100 to $150 a mile; any good mechanic can construct a line; No. 9 wire costs 8½ cents a pound, 320 pounds to the mile; 34 insulators at 25 cents each; the price of poles and setting wires varies in every locality; stringing wire $5 per mile; sundries $10 per mile.

Parties leasing the telephones incur no expense beyond the annual rental and the repair of the line wire. On the following pages are extracts from the Press and other sources relating to the telephone.

GARDINER G. HUBBARD.

Cambridge, Mass., May, 1877.

For further information and orders address

THOS. A. WATSON, 109 Court street, Boston.

HOW TO USE A TELEPHONE.

To be a good telephone talker is something of an art. In all cases the transmitter should be as nearly vertical as possible, and so adjusted that it is on a level with the lips when the head is in the ordinary arched position of conversation. Then the lips should be about an inch away and directly opposite its center. Talk about as loud as if speaking to a person across the room. But, more than all, care should be taken to talk slowly and to articulate with the greatest distinctness; to be deliberate on what one says and to make ample pause at the end of each sentence. Nothing can be more erroneous in the use of a telephone than to stand at a distance from the instrument and endeavor to affect it by shouting at the top of one's voice.

The Telephone in Foreign Countries

MUNICIPAL OWNERSHIP IN GLASGOW.

It is more than ten years ago since Glasgow proclaimed revolt against the high charges and bad service of the private telephone company. A committee of the city council reported in favor of establishing a municipal plant, and it was determined to apply to the postmaster for a permit. This precipitated a fight, which lasted for seven years. Various committees from the house of commons heard testimony. The postoffice department refused to grant the license. The imperial government was thus allied with the telephone trust against Glasgow. In this crisis the various cities of Great Britain made common cause with Glasgow and backed her in the fight for a franchise. Without going into details it may be stated that the allied cities won, and on March 1, 1900, Glasgow obtained the first license ever granted to a city for the purpose of constructing and operating a telephone system.

The telephone committee has as its chairman Bailie John Alexander, a wealthy carriage manufacturer of Glasgow. I had a delightful interview with this gentleman, writes Frederick M. Adams in the Brooklyn *Eagle*. He is a firm believer in the theory that the municipality or the nation shall take over the control of all industries or institutions susceptible of monopolistic control by private capital. It seemed strange to hear such radicalism from the lips of one who has acquired an enormous fortune, but John Alexander is of a common type in Glasgow, and for that matter in Great Britain.

Having won the right to install a municipal telephone plant the Glasgow authorities set about the selection of a capable manager. After some careful consideration the position was offered to Alfred R. Bennett. Years before Mr. Bennett had attained fame and standing as an electrical engineer and inventor. He made his start in India in 1869, where he won the cherished "special mention certificate" from the Indian government for proficiency in submarine cable and land line testing. On his return to England he was made manager of the Highton Batteries Company, and for a quarter of a century has been at the fore in matters electrical. His inventions and experiments cover the whole range of the art. He placed the first telephone wires in Great Britain, and was the pioneer in the lighting of mines by electricity. In addition to inventive and engineering talents, Mr. Bennett possesses marked literary ability. He is the author of several books and for several years was the editor of a successful technical magazine. Men of this type fill the great administrative offices of Great Britain, and it is their tireless and intelligent supervision that does so much to insure the success of the enterprises financed by public capital.

The work of construction was begun in July, 1900, and up to the present time Glasgow has expended $1,350,000 on its telephone plant. While the city contains only twenty square miles of territory, the telephone wires reach out over nearly ten times that large a district.

Under the old telephone company no effort was made to reach the suburban area. The private company catered only to the congested district, and imagined that they would lose money if they improved the service, extended the scope or lowered the rates. Under their managment the average annual cost of a telephone was $60 or more. It took from one to ten minutes to make a connection. London is in the same plight to-day that Glasgow found itself in four years ago. The private telephone systems of Great Britain are inefficient almost beyond belief.

The Glasgow telephone service is the best I have ever inspected. Mr. Bennett informed me that their statistics showed that the average time required to make a connection was less than fifteen seconds. I made a test on my own account, and called up ten subscribers. Of the nine who responded, the average time from unhooking the receiver to answers from those addressed was fourteen seconds. It should be explained that the telephone booth is practically unknown in the office of a Glasgow business man. The instrument is on the edge of his desk, and the receiver and transmitter are in one piece. This aluminum device is connected with a wire cord, and the customer may converse leaning back in his chair or walking about the room, as he prefers. It is a most decided improvement over the clumsy and antiquated system which yet prevails in most exchanges in the United States.

The rates to a subscriber for a service with an unlimited number of calls over the entire system is $25.50 a year. There is no installation charge, and no dues of any kind other than the annual payment of this amount. A toll service is rendered for $17 a year, with an additional charge of a penny for each outward message, with unlimited inward calls free. On a party line with more than four subscribers the rate is $6 per annum, with an unlimited number of calls.

Permit me to make a contrast. I live in a suburb of New York city, and it costs me forty cents to telephone to any part of the city and fifty cents to get a connection with Brooklyn. Newark, New Jersey, is only twenty-five miles away, and the rate is seventy-five cents for a few minutes' conversation. We pay five times as much a thousand feet for gas in Hastings-on-Hudson as they do in Glasgow, and it does not cost half as much to put it in the mains. We pay four times as much for electric light. We pay two cents a mile to ride on the railroad between our village and New York, which is about four times the rate charged for suburban transit in any part of Great Britain or Europe. But we of New York are so used to being robbed that we actually enjoy it, and resent the suggestion that relief should be sought either by legislation or public ownership.

There are 11,000 subscribers to the municipal telephone system of Glasgow. The private company predicted that the insanity of the management in reducing rates and giving decent service would result in financial ruin, but the investment showed a profit of $70,000 last year, and the indications are that the present year will put the figure beyond the hundred thousand mark. In that event the management will materially reduce the rates. They have no intention of extorting a profit from those who patronize the service. Surely the Scotch are a strange people.

LONDON'S TELEPHONE SYSTEM.

The principal reason why London has not yet got an adequate telephone service, although all the machinery is available for providing it, is that it has never been possible to lay down a comprehensive system of wires. One most essential feature of a city telephone system is the wire plant, and this must be laid out on a broad and comprehensive scale, so that subscribers in all parts may readily be connected to the exchanges, and the various exchanges connected to each other, says Herbert Laws Webb in the London *Mail*.

The London telephone area is the greatest and most unique in the world—640 square miles in extent, practically ten times as large as the New York telephone area and

eight times as large as that of Chicago. To lay out a distribution system over this immense area sufficient to provide a telephone service for several hundred thousand telephone users is an engineering and financial problem of the first magnitude. A basis of such a system—which can only be effectively provided by means of underground wires—would have been established long ago but for the opposition of the street authorities in London, who have persistently refused to allow underground telephone wires to be built. In New York there have been no such difficulties. A comprehensive network of telephone conduits underlies all the main streets and reaches to all the boundaries of the city.

In London the great majority of wires originate at one exchange, and are completed at another, because the subscribers are so far apart. To carry this enormous flood of messages to and fro across the length and breadth of the great city, from exchange to exchange, requires an elaborate system of "junction" wires interlacing all the exchanges together, so that each may exchange traffic with every other. Owing to the difficulty of erecting wires overhead, it becomes next to impossible to provide junction wires between all exchanges in sufficient number to cope with the traffic at all hours of the day. During certain hours there is a great concentration of traffic, and then blocks often arise because at certain moments every available junction wire is in use. With underground conduits junction wires can be added at any time in proportion to the traffic, but not so with congested overhead routes subject to constant difficulties through building operations.

The importance of these junction wires is illustrated by a recent incident in New York. An underground fire, indirectly due to the "rapid transit" upheaval of the streets, destroyed some 5,000 telephone wires, among them the junctions joining three large "downtown" telephone exchanges with the rest of the system. Until the cables were repaired, a work which occupied nearly two days, business in New York was practically suspended.

The recent work of the postoffice in London is an illustration of the cost and complexity of the telephone system of a big city. The postoffice began work more than four years ago and up to last January had spent £1,500,000 on telephone cables and exchanges to serve comparatively a small part of London. There are about 16,000 telephones now connected to the postoffice system and, although cables have been laid in sufficient number to accommodate many more telephones, still the system so far built serves only a small portion of the London area.

British bankers will not use the telephone service. In America bankers are wholesale users of the telephone. In London there is not a hotel having telephone service in all the rooms. In New York the hotel which does not have the city telephone service in every room is the exception. The metropolitan police refuse to use the telephone. The New York police have an elaborate system of their own and connection with the general system at every station. In New York for years past the police have managed all large processions by telephone. In London the police and the military manage processions by flag signalling! The broad difference between the American and the British public, and their respective authorities, is that the former welcome all devices aiming at saving time and increasing efficiency, while the latter resist them to the last ditch.

NO SUCCESS IN MANAGING TELEPHONES.

The Marquis Montebello of Paris, founder of the "syndicate for resisting oppression by the telephone monopoly," said in a recent interview: "We are not opposed to state ownership, but demand that the state administer any monopoly it may possess in a business-like way; it must not be employed to harass and browbeat citizens. There are 30,000 telephone subscribers in Paris, and it is our aim to persuade 10,000 of this number to stop their subscription until the state gives adequate service and foregoes its alleged right to prosecute people who lose patience with its foolish rules and restrictions and the miserable operations employed. If we can get 10,000 subscribers to quit, it means a loss of 4,000,000 francs per annum to the state, and reforms will quickly follow. Whether a monopoly is owned by the state or individuals, the way to make it behave leads through the pocket. And the pocket we are going to attack good and hard. The organization is quickly perfecting and the minister of finance will soon send in his card and ask: 'What can we do for you, gentlemen?'

"'Here is our list of complaints,' we will say, "each of which must be complied with before you get back your subscribers: First, the telephone must work every day in the year, not only when your operators see fit to attend to business; second, when a subscriber loses his patience with the instrument or the fool of an operator, and uses some language, he durst not be prosecuted for insult to an official person. The girl may sue him as an individual, but not as a person of the style and pretensions of the German kaiser; third, as long as a subscriber pays his dues, the state has no right to remove his telephone, whether he swore into the telephone or not. If the state objects to swearing, let it ask Mr. Edison to invent a wire that won't carry oaths. Otherwise, wires must be made tough enough to carry words of any character subscribers feel moved to utter. Of course, if the telephone girls feel offended, let them sue. That is their sacred right.'"

The marquis referred to Mlle. Sylviac, the actress, whom he designated as the latest victim of the state monopoly. Mlle. Sylviac complained that, though her telephone fees were paid until January, 1905, the state had removed the instrument from her flat just because she had dropped a word commencing with a big "D" in talk to her manager. "The manager," she said, "didn't care; he is used to it; but some cat of a telephone girl was listening, of course, and she blabbed on me. An hour later they yanked away the instrument, and my friends and admirers must needs spend all their spare cash for messenger boys and telegrams. Talk of Russia—France is ten times worse than Russia. I admire the public spirit of M. le Marquis de Montebello, who has taken up the cause of poor working girls like me."

TELEPHONE USED TO SIGNAL TRAINS.

Experiments were carried out recently on a section of the French state railway between Chenu and Chateau la Valliere, in the Sarthe department, with a system of automatic electric signaling destined, says the London *Standard*, to reduce the possibility of collision between railway trains to a minimum. The system is the invention of a Spanish engineer, Senor Basanta; but it has been taken up by numerous French deputies, and notably by M. Coutant, one of the members for the Seine department. A large party, including engineers from all the French railway companies and a number of deputies, journeyed to Chateau la Valliere to witness a demonstration of the new system upon the section of the railway where it has been laid down.

The system consists of the application of the telephone to railway trains. Upon each of the trains used a modified telephone receptor and transmitter is fitted. To one of the axles of the engine or guard's van a small dynamo is attached, developing the required electric energy, while a shoe or trolley affixed to the axle trails along a special wire which has to be fitted along the track and the holders of which are driven into the sleepers. As with the block system, the line is divided into sections, and at each section end, which may be a railway station or signal box, there are fitted special telephone transmitters and receptors.

By these means the shoe, which slides along the wire, forms the circuit with each section end, and it is possible for

the persons in charge of either the signal box or station to at any moment enter into communication with the driver or guard of the train or vice versa. By an ingenious device if a second train gets onto any section before the first train has left it alarm bells ring on both trains. One or both of the trains can then pull up and a conversation as to the course to be adopted can be held between the two. The experts who examined the apparatus and saw its demonstration admitted that it was most ingenious and that it might be a useful adjunct to the block system; but, owing to the apparent delicacy of several of its principal organs, there were few who would admit that it was a system which could be depended upon alone.

MEXICAN TELEPHONE COMPANY'S REPORT.

The report of the Mexican Telephone Company, just published in Boston, for the year ended February 29, 1904, compared with the showing for the year ended February 29, 1903, in Mexican currency, is in the abstract as follows:

	1904.	1903.
Telephone rentals	$257,994	$232,583
Private wires, etc	16,883	13,785
Gross earnings	$274,877	$246,368
Operating expenses	$ 96,401	$ 87,367
Maintenance	43,590	47,004
Total expenses	$139,991	$134,371
Net earnings	$134,886	$111,997
Construction	$ 57,529	$ 43,326
Taxes	8,128	8,878
Total deduction	$ 65,657	$ 52,204
Balance	$ 69,229	$ 59,793

The report states that the net revenue, reduced from Mexican to United States currency, was $52,523 in 1904 against $37,746 for 1903, an increase of $14,778. The value of the Mexican dollar in the year ended February 29, 1904, fluctuated from 46.51 cents gold, maximum, to 38.24 cents gold, minimum, giving an average value of 43.75 cents gold or United States currency.

The number of telephones in service on the first day of March, 1904, was 4,904 and the monthly rental was $22,820 against 4,478 telephones and $21,111 monthly rental on the same date in 1903. The report shows that on February 29, 1904, at the home office in Boston, according to the balance sheet, the total assets of the company amounted to $2,018,239, of which $83,580 was cash on hand; the liabilities aggregate $2,018,239.

President Charles H. Rollins of the Mexican company says: "A new concession for a term of thirty years has been obtained from the Federal government, including Mexico and all other towns in the Federal district. This concession requires an underground system in a part of Mexico City, which will necessitate the providing of a considerable sum of money in the immediate future."

TELEPHONE MUDDLE IN ENGLAND.

The city municipal conference on the telephone question came to the commonsense conclusion that the Government have nothing to gain by spending public funds in the purchase of the National Company's expiring rights, says the *Pall Mall Gazette* of London. It is not a question of the terms proposed, but of the expediency of giving the company an advantage to which it is not entitled, and we can understand the resentment that the popular representatives feel against a corporation that has so consistently misused its past monopoly. There is, however, another side to the question: it does not affect London alone, and there are important cities in the provinces that do not enjoy the benefit of the partial competition of the Post Office, and it is in behalf of these unfortunate communities that the Post Office authorities are chiefly concerned. During the whole of the expiring period of the company's license the lot of the users of their system will conceivably be one of increasing exasperation and annoyance, owing to the very natural desire of the company to save expense in the maintaining of plant and instruments in which their interest is dwindling. In these circumstances there may, after all, be room for a compromise.

WHERE THEY TELEPHONE TO DOGS.

A French tourist relates that some time ago he set out to cross St. Bernard pass by himself, and he got caught in the fog near the top. He sat on a rock and waited for one of the dogs to come and attend to him, but in vain, and when the fog cleared away he managed to reach the hospice. On arrival he observed that he thought the dog a rather overrated animal.

"There I was," he said, "for at least six hours and not one came near me."

"But why," exclaimed one of the monks, "why did you not ring us up on the telephone?"

To the astonished tourist it was explained that the whole of the pass is provided with shelters at short distances from each other, all in direct telephonic communication with the hospice. When the bell rings, the monks send off a hound loaded with bread and other comforts. The dog on duty is told what number has rung, and he goes straight to that shelter. This system saves the hounds their old duty of patroling the pass on the chance of a stray traveler being found, and as the pass is for about eight months of the year under snow, this entailed hard and often fruitless labor.

BEHIND THE TIMES IN EUROPE.

It is a well established fact that most European countries are from ten to fifteen years behind the United States in the use of the telephone. Two causes are assigned for this—government control of telephones and proverbial conservatism and slowness of foreign people. Comparatively little business is transacted abroad over the telephone. In London even the Bank of England has not a telephone installed. In Berlin the telephone exchange is shut down whenever a thunderstorm occurs or even appears likely. In most of the smaller cities of England and the continent the telephone exchanges are not opened at night at all. In none of them is the business per instrument more than a small fraction of the business in this country. In general, the telephone in Europe is as far behind America development as are the electric car and electric light. It is significant that all of the three have been under government control in European nations and under private control, for the most part, in America. The vigorous and successful campaign waged by the Independents has, no doubt, been the chief agency in procuring good service in this country.

WIRELESS TELEPHONY IN GERMANY.

Wireless telephony, according to E. Ruhmer's method, has been developed to a marked degree in the course of the past year. This method, as is well known, is based on the photo-electric properties of selenium, on one hand, and the phenomenon called the "speaking arc" on the other. The microphone current at the sending station will result in luminous fluctuations being produced in an arc lamp installed in the focus of a parabolic mirror. This flickering of the lamp, corresponding with the sounds spoken into the microphone, is reflected by the mirror onto a similar parabolic mirror installed at the receiving station and containing in its focus a selenium cell, transforming the luminous fluctuations into fluctuations of current, which in a telephone are converted again into sound waves, analogous to those striking the microphone at the sending station. This system, after having been tried on Wannsee lake, has been put to trials

over distances up to fifteen kilometers and more in Kiel harbor. The satisfactory results obtained there will, it is rumored, induce the army and navy of several countries to adopt the system officially.

THE ELECTROPHONE IN ENGLAND.

For some years that modification of the telephone known as the electrophone has enabled people at their own homes to listen to performances at concert halls, theaters, etc., says *Chambers' Journal*. The apparatus has now been brought to such perfection that on the occasion of Mr. Chamberlain's recent speech at Birmingham his words were listened to in London and taken down in shorthand, a verbatim report appearing in the London *Evening News*. The matter occupied eight columns of type, and was being eagerly read by Londoners about 20 minutes after Mr. Chamberlain had concluded his speech at Birmingham, more than 100 miles distant. This is certainly a great achievement, and marks a new departure in journalism. Possibly some day the electrophone or some such apparatus will be made to work automatically in union with a type-setting device, so that the verbatim reporter will find his occupation gone. But that time is not yet. There are very few public speakers whose utterances will bear verbatim reporting.

THE TELEPHONE THAT REMEMBERS.

Ernest George Craven, an English civil engineer, who formerly was in the employ of Mr. Edison, has invented a telephone which records its messages permanently. He started with the theory that the sound-giving diaphragms of telephone and phonograph are substantially alike. In both instruments, a diaphragm is set moving by sound-waves. In the phonograph, this motion is impressed on a wax cylinder, which preserves it and can give it back to the air as sound. In the telephone, the motion of the diaphragm is changed first into electrical impulses transmitted by a wire, and then changed at the other end into corresponding diaphragm movements, which reproduce the sound. Mr. Craven's problem was to make telephone and phonograph work in electrical unison. His instrument, called the electrograph, has sent and recorded messages successfully over ordinary telephone wires, though as yet only at small distances. It needs some mechanical improvements, but these will be easy to make. The telephone that remembers: a good many persons may much prefer a telephone that forgets.

STATE AND INTERURBAN TELEPHONE SYSTEMS IN AUSTRIA.

The development of the Austrian telephone networks is shown by the following table, recording the condition corresponding to the end of 1903 and 1902, respectively:

	Telephone systems.	Public call offices.	Subscriber stations.	Interurban telephone circuits.	Length in Km.
Dec. 31, 1903.....	247	767	42,502	134	10,702,080
Dec. 31, 1902.....	216	658	37,375	117	9,848,901
Increase	31	109	5,127	17	853,179

TELEPHONING WITH LIGHT WAVES.

Photo-telephony has reached a commercial basis in Germany. Ernst Ruhmer of Berlin has contrived an apparatus by which intelligible speech can be transmitted over a distance of nine miles with the aid of a beam of light. The principle of the machine is based upon the sensitiveness of an arc light to sound, combined with the property of selenium, of varying its electrical resistance with the slightest variations in the intensity of a ray of light falling upon it. A searchlight projector at the transmitting end of a selenium cell in a telephonic circuit at the receiving end are the essential features of the apparatus. For use in misty weather when speech would be inaudible, the inventor has contrived a method of transmitting Morse sound signals by periodic pulsations of the light.

THE TELEPHONE IN MEXICO.

A telephone line is being built between Zamora and Chavinda, Mexico.

Weisel and Kok of Parral, Mexico, will install a telephone system in Jiminez, Mexico.

A telephone has been inaugurated from Acarachero to Nocupetaro, in the state of Michoacan.

A new telephone line is being constructed between Opichen, state of Yucatan, Mexico, and the town of Celentur in that state.

A company is being organized at Culiacan, Mexico, for the purpose of installing a new telephone exchange and to build and operate long-distance lines throughout the state.

A report has been made by the state government of Sinaloa, Mexico, showing that there are 1,058 miles of telephone lines in operation in that state. A new telephone line has been constructed between the port of Topolobampo and the town of El Fuerte, along the Kansas City, Mexico and Orient railroad.

The concessions held by Jose Sitzenstaller from the federal government of Mexico and from the city council of the City of Mexico for the construction of a telephone system in the Mexican capital and the other towns situated in the federal district, have been extended for a further term of six months from May 4, in which to commence work.

TELEPHONE NOTES FROM ABROAD.

The telegraph and telephone lines are owned and operated by the Japanese government, with over 60,000 miles of wire.

It is proposed to establish a new International telephone line between Madrid, San Sebastian, Barcelona and Paris.

Japan is everywhere rich in waterpower; consequently, even in small country towns where there are electric lights and local telephone lines.

An American syndicate has secured control of the telephone system, together with the electric light and tramway plants, along the Panama canal.

The telephone has been dramatized! "At the Telephone" is the title of a play now being enacted in London. The feature of the play consists of the murder of a woman by a tramp, the details of the crime being transmitted to the husband, several miles away, by telephone.

The National Telephone Company is offering to place telephone call offices in public libraries in London, the respective local authorities to receive ten per cent of the receipts in return for the concession. The Southwark borough council was one of the first to accept the proposal.

The town council of Walkerville, Ontario, has refused to renew the franchise of the Bell Telephone Company unless the company pays more money for its privilege. The town of Sandwich, Ontario, some time ago refused to renew its franchise to the company on precisely the same grounds.

According to the London *Electrical Magazine*, the King Edward Sanatorium, in Guernsey, is now fitted with light portable hand telephones, so arranged that the nurses can carry them to the bed of any patient, enabling conversations to be held between patients and friends in any part of the island without fear of infection.

The city council of Ottawa, Ontario, by a vote of thirteen to ten, decided to give the Bell Telephone Company an exclusive franchise for two years. The main conditions are: Business telephones, $45; residential telephones, $25, or $20 when four customers use the one line; the city to be supplied with twenty telephones free of charge; the company to pay

the city $1,500 for business done during the past year, and $2,500 annually during the agreement.

M. Malcotti, an Italian engineer residing in Brussels, has invented an instrument which he calls a telecriptograph, and which will reproduce in print all conversations held over the telephone. He has already secured patents in several European countries and in the United States, where he intends to install his service with the aid of some telephone company. The inventor claims that his instruments will work over any ordinary telephone line.

A cable dispatch from Paris says: "Drastic proceedings in the telephone administration of Paris, shown in the case of Mlle. Sylviac and others, are exciting a storm of protest in all directions. Among others a meeting has been held at the Palais de Justice at which 200 young lawyers were present. Four speeches were made against the assumption by the government of power to fine subscribers at will, and by 180 votes against twenty the telephone administration was scathingly censured."

The Portsmouth, England, borough accountant has submitted to the telephone committee of the Telephone Company the balance-sheet for the year ended March 31, 1904. The working expenses were £3,899; repayment of principal and interest, £1,464; income £6,588; and profit, £1,225, which latter sum, added to the profit made in March, 1903, of £25, gave a total of £1,250. On the suggestion of the accountant, the committee decided that £43 1s 6d be written off as bad debts, and £60 placed to reserve for further bad debts.

The famous telephone case, in which Mlle. Sylviac, the charming Parisian actress, was prosecuted in the criminal courts of Paris by the telephone administration for insulting employes, ended in Mlle. Sylviac's acquittal, to the manifest joy of many professional and fashionable celebrities who crowded the courtroom. The court decided, however, that demoiselles de telephone (hello girls) are citizens in the public service, and, therefore, must be treated with due circumspection. To insult a fonctionaire is much more serious than insulting the ordinary person.

The latest reports of the telephone systems of foreign countries which can be obtained show that the German empire, with a population of 56,367,178, had on January 1, 1903, 392,924 telephone stations; Great Britain, population 41,605,801, on January 1, 1904, had 294,881 stations; France, population 38,961,945, had on June 1, 1903, 100,692 stations; Sweden, population 5,175,228, on January 1, 1903, had, including the government system and those of the private companies, about 95,000 stations; Switzerland, population 3,327,336, had, on the same date, 46,687 stations; Austria, population 26,150,708, had 38,225 stations; Denmark, population 2,449,540, about 38,000 stations, and Norway, population 2,221,477, had 37,519 stations.

A combination of the Nova Scotia Telephone Company, the Eastern Telephone Company, and other companies has just completed a telephone system 293 miles long. It runs from Halifax to Cape Porcupine, via Truro, New Glasgow and Antigonish. Connection is made over the strait of Canso by a submarine cable; the line then runs to Sydney direct. A branch runs from Aulds Cove to Mulgrave and another from Port Hastings to Hawksburg. Connection has also been made with the Sherbrooke Telephone Company at Antigonish and with lines running to St. Peters and Narricht at Port Hawksbury; at Orangedale with Marble Mountain and Baddock and at Sydney with North Sydney, Synod Mines, Glace Bay and Lewisburg. Over 100,000 pounds of copper wire and between 13,000 and 14,000 cedar poles were used in the construction. The cost of building the line was nearly $100,000 and a rate has been struck at $1.25 for a three-minute conversation between 8 a. m. and 6 p. m., and 65 cents for the same between 6 p. m. and 8 a. m.

THE OTTUMWA, IOWA TELEPHONE PLANT FOR SALE;

At the annual stockholders' meeting of the Ottumwa Telephone Company, held at Ottumwa, Iowa, resolutions were adopted authorizing and instructing the trustee, in charge of the plant since last November, to sell it at private sale.

This action became necessary on account of the failure of the principal stockholders in the company, whose stock was put up as collateral, and by their failure passed into the hands of their creditors. By an agreement with all the stockholders of the company, the creditors are authorized to make a private sale of the plant, and in this way avoid the necessity of court proceedings, which would cause increased expense and long delay.

The Ottumwa Telephone Company in the past two years has built a substantial three-story, semi-fire-proof telephone building, with red pressed brick front and lime-stone trimming, and also has rebuilt the entire plant. They have installed a central energy system, equipped for 1,540 full metallic lines, with selective ringing, and the necessary power and battery installation. They have installed 1,250 telephones and there are 250 names on the waiting list. They have eighty miles of toll line, 70,000 lineal feet of conduit, seven miles of aerial cable, with all the necessary fixtures and appliances.

The company is a growing concern and will have 1,400 telephones installed by the middle of July. This is one of the best Independent telephone propositions in the state of Iowa, and will bear the closest inspection. Anyone desiring further information can receive the same by addressing The Citizens' Savings and Trust Company, Cleveland, Ohio, or Henry S. Herr, Ottumwa, Iowa.

BATTLES WITH TELEPHONE LINE.

In an exciting time at the farm of Mrs. Charles Day, on the Day road, in the town of Lockport, New York, the farmers of that vicinity, acting in concert, fought off the efforts of the Niagara County Home Telephone Company to string a line across the property of Mrs. Day.

Negotiations had been pending between Mrs. Day and the company for a long time. On a recent Sunday the company determined to construct the line, and knowing that no injunction could be obtained, a force of sixty men was put at work. The company's efforts to defeat the law, however, proved futile, as the farmers of the section organized and thwarted their efforts. Road scrapers were secured and as fast as the holes were dug by workmen the farmers filled them up. In the meantime Mrs. Day had sent for a lawyer and constables were brought to the scene.

Crossing Mrs. Day's property twenty-three poles were necessary, and she demanded less money than the Home company paid Hiram Mattison, a nearby farmer, for the same privilege, which was adjusted by a commission. The company finally settled with Mrs. Day and went ahead with the work.

Fifty prominent business men of Evansville, Indiana, have organized the Citizens' Telephone Company, with a capital stock of $100,000. Nearly the entire amount of stock has already been subscribed. The company has been granted a franchise and will install a system at once, which is intended to supersede the Cumberland Telephone Company. The latter company's franchise has expired and it has been ordered by the city to vacate. A municipal company was formed, but was found to be unlawful, and now the Independent company takes its place. The city is promised an annual royalty of $3,500, subway wires in the downtown districts, and the privilege to buy the company at stated periods.

Fighting of Electrical Fires

CHARLES H. COAR.

For want of a better and more definite phrase, the term "electrical fires" is used, because in treating this subject it is intended to class all fires occurring in or about any electrical apparatus, appliances or accessories as such, whether the origin of the fire was due to electrical causes or otherwise. The fact that a tremendous amount of damage is needlessly done during the extinguishing of these fires leads me to believe that the subject is well worth discussion by telephone men and all in any way interested in the electrical business.

The writer has come to the conclusion, by questioning different members of several large-sized municipal fire departments as to the amount and kind of information given the members in regard to fighting these fires that there are many points involved that could and should be decidedly improved upon. Fire departments usually issue rigid instructions as to the procedure, adopted as best, in fighting fires in or about oil tanks, powder magazines, etc., which are adhered to in most cases, if the existing conditions will permit. In the case of a telephone switchboard fire, however, several streams of water, or a chemical solution, which is far more detrimental in its effect on the apparatus than the fire, is often deemed necessary to extinguish a small blaze, which a few handfuls of sand, a couple of hand grenades or a tube of fire extinguishing powder would quench.

It must be taken into consideration, of course, that all electrical fires usually have very inflammable material in or about them, and that an extensive blaze often results from a small portion burning. These flames are undoubtedly very misleading, and are apt to be the indirect means of needless destruction during the extinguishing of the fire, as the firemen are led to believe, by the apparent viciousness of the blaze, that the fire has gained great headway and that the most stringent measures are necessary to get it under control. Upon entering a telephone switchboard room, for instance, and finding the switchboard ablaze and the room full of smoke, these firemen resort to the hose line and high water pressure, literally blowing the board to pieces and ruining by dampness all that the flames did not destroy. Possibly the board is approached after the flames have been subdued, and the fire is found most likely to have been in one particular section, whereas the damage wrought is recklessly distributed throughout the whole board. An instance of this sort came under my observation a short time ago and is used for example, not with the intention, however, of discriminating against any particular fire department.

The fire I refer to was confined in the last section of a telephone switchboard, but the larger portion of the board was completely drenched in extinguishing this blaze, which was more like a flame burst, caused by paper or some other light inflammable material, than it was like a destructive heat-giving fire. I feel positive that this fire could have been extinguished without resorting to the use of any liquid mixtures whatever.

Fires occurring in generating stations are very dangerous to work on unless all the generating machines or current entering the building is shut down, for water is a fairly good conductor for heavy currents of electricity, so caution is necessary in directing streams upon such apparatus until the exact condition of affairs is known. In the large departments one will invariably find the hose nozzles covered with leather or other insulating material, in view of affording the person grasping it some insulation against accidental current discharges.

Water or chemical solutions should only be used as a last resort in extinguishing electrical fires, for it is a logical conclusion that water, being a conductor of electricity, would not be desirable, because of the damaging effects it would produce by short-circuiting or grounding, as the case may be. The careless chopping with picks or axes should be avoided, especially among electrical cables, which are very easily made defective. The writer once belonged to a medium-sized fire department as an "extra" and knows the indescribable feeling that steals over one engaged in fighting fires, to pounce on anything and everything with ax or pick and smash it, feeling like a hero while so doing.

Whenever it is possible to smother electrical fires, it should be done by all means, for in this way the loss sustained is, in most cases, confined to the damage resulting from the fire alone, and will be found very effective against fires occurring in distribution racks or in any similar place, where masses of wires have to be contended with. Sand forcibly thrown into a fire of this description tends to sift into all the little crevices and openings, thereby smothering the fire without any appreciable amount of detrimental effects in so doing. It is because of this reason that the dry preparations for fire extinguishing purposes should appeal to anyone placed in jeopardy by these fires. There are several dry preparations on the market, which are contained in tubes or vessels constructed with a view of being convenient to handle at such times as they are in use. The only objection held against these preparations is that the containing tube is sometimes made of tin, forming a dangerous current to the man using it upon making accidental contact with some of the wires carrying the excessive current. It would be well to provide some kind of insulation about the part grasped, on such tubes as are likely to be used in extinguishing electrical fires, if the containing vessels are not made of non-conducting material.

That municipal fire departments should carry and use preparations of this kind in all instances where the conditions permit will seem a feasible idea to most people, upon its consideration, and its adoption in such places as are not already so equipped, rests in a large measure with the amount of discussion given this subject by persons directly concerned in places liable to this class of fires. Some will no doubt say that the insurance companies would inquire into the merits of this kind of fire fighting. Perhaps they would, but in the meantime, nevertheless, comparatively high insurance rates are charged on these places, owing to the heavy losses usually sustained by the insurance companies in electrical fires.

The writer has perused many able articles read before the different electrical conventions, but has failed as yet to see this subject receive the attention that it should. There undoubtedly are many persons in the electrical profession who have the means and time to ascertain the value of the different methods by experimenting.

It is almost needless to say that a great many of our disastrous fires are caused, or materially helped, by the careless habit of leaving oily waste, oils, wiping cloths and many other highly inflammable materials in or about places susceptible to fire. Stringent rules should be adopted in all places with the view of promoting all possible precaution against any practice which not only places business property, but often lives, in jeopardy. Gasoline or any gas giving oil

should have its place for storage, and this should be outside the building, in some kind of a structure, preferably brick or stone, having good ventilation; oily waste should be placed where it is beyond danger from fire, and many other practices which are now in vogue could be altered to better serve the best interests of all concerned.

In many of the large manufacturing concerns one can see posted in conspicuous places, simple fire rules outlining the best procedure in case of fire, and ofttimes a fire brigade is organized among the employes and some of the more necessary fire fighting appliances are placed at their disposal. The readiness and preparation of such places has often been the means of extinguishing small blazes which would have been beyond control entirely by the time the regular fire department was in position to commence fighting.

The thought has occurred to the writer several times, after viewing wrecked telephone switchboards, why it would not be a feasible scheme to have the board made in such manner that asbestos fire doors could be inserted crossways through the board at certain intervals, or sections, thus offering protection against a fire occurring in an adjoining portion. This form of construction would not necessitate much expenditure during the installation, as the different cables could be let down under the floor and up again, wherever provision was made for the insertion of a fire door. Canvas, no doubt, would be found very useful in extinguishing fires, and a few such blankets should be part of the equipment of every switchboard room, along with some fire extinguishing compound or sand.

There are many different thermal arrangements which could be installed in these places, thus affording an alarm whenever the temperature rises above a certain point. "Montauk" cable, for instance, could be installed throughout the dangerous places of a switchboard comparatively easy, as the wires entering into its composition serve as the conductors. In case of an installation of this kind, arrangements should be made to divide the alarm wires into suitable divisions in order that one could readily determine what portion of the alarm was in operation, if the alarm sounded.

In conclusion, I would say that all concerned should investigate this subject thoroughly, as it will be found a topic promising good results. In any event a change from some of the present conditions could hardly be worse, and would in all probability be an improvement.

SIOUX CITY COMPANY PLANS FINE EXCHANGE BUILDING.

The Sioux City Telephone Company, which is installing an Independent automatic telephone system in Sioux City, Iowa, has fixed September 1 as the date on which the system is to be ready for operation. The plans for their building have practically been completed. It will be of brick and stone and will cost from $20,000 to $25,000. It will be 45x90 feet, two stories in height, with basement, one-half of which will be above the level of the street.

"It is our purpose to locate the building as nearly in the center of the telephone district as possible," said F. G. Bills, secretary and treasurer of the company. "By procuring a site that will be central for our lines as they radiate to the various parts of the city, we will save expense in cable materials, wire and other equipment. Our Lincoln, Neb., system, which we recently finished, was completed in ninety-four days, and it has about 2,500 subscribers. Here we have thus far about 2,100 names. We have a good deal of material on hand now in the shape of wire, poles, etc., but we want to wait until the poles all arrive before we start our line work."

A complete telephone system is to be installed in Lima, Peru, by American capitalists.

K R LAW AS APPLIED TO QUADRUPLEX CIRCUITS.

[In view of certain tests being made at the present time both in telegraphic and telephonic fields, involving the KR law, a reproduction of an article bearing on this subject, written by William Finn, of the electrical engineer's department of the Western Union Telegraph Company, New York, and published in Telegraph Age as long ago as February 1, 1896, will throw much light on this important matter about which too little is known. The article was so carefully prepared at the time that its reprinting is made absolutely without change.—Editor.]

Attempts innumerable have been made in the past to improve the working of the quadruplex system, which, as every experienced telegrapher knows, is still far from being a perfect one, especially when operated upon long lines. This is because there has not yet been found, for its "No. 2 side," a simple receiving apparatus with a sufficiently low "time constant" or requisite degree of delicacy to respond promptly to the first impulses of the current waves which flow to line after each reversal of the sending battery.

The distance to which it is possible to operate successfully a quadruplex circuit with a given potential is, in reality, limited by the electrostatic capacity (K) and the resistance (R) of the line; the former factor of which tends to absorb a portion of every current wave or impulse sent into it, while the latter affects the final strength of the current flowing through it.

The number of signals that can be transmitted per second over any telegraph circuit depends, in fact, upon the numerical value of its capacity in microfarads multiplied into its resistance in ohms, or upon what is known as the "KR law," which has long been understood to determine the carrying capacities of all our long submarine cables, fast speed automatic circuits, etc., but the applicability of which to quadruplex working has not been so generally known or appreciated.

In telephony this particular law has played a very important part, inasmuch as it has rendered possible the calculation of the size of wire required for the successful transmission of speech. It has determined, for instance, that

When KR = 15,000, speech becomes impossible.
When KR = 12,500, speech becomes possible.
When KR = 10,000, speech becomes good.
When KR = 7,500, speech becomes very good.
When KR = 5,000, speech becomes excellent.
When KR = 2,500 or under, speech becomes perfect.

So that if a suitable value be adopted as the KR constant for any projected telephone line, it will only be necessary to select the proper kind and diameter of wire, the product of whose capacity in microfarads into its ohmic resistance will give the required standard.

It may here be remarked, however, that the accuracy of the KR law has been questioned with regard to its general application, instances having been cited in connection with the construction and operation of American telephone lines which apparently went to prove that the law is only safely applicable to circuits whose length is within the limits of those by which the rule was formulated. Sir W. H. Preece, who enunciated the formula, has pointed out, however, that in the case alluded to the value of K was not accurately determined, since the purely metallic character of these circuits exercises a modifying influence upon their electrostatic capacities; or, in other words, reduces the values of K, a consideration that had apparently been lost sight of. Hence the deductions drawn from the measurements made and results obtained in practice, which were quite at variance with the rule laid down, were shown to be based upon false premises, inasmuch as a more correct estimate of their KR values accorded very well with the formula as well as with the telephonic effects observed.

Now, since the KR conditions of a line have such an important bearing upon the working of telephone circuits, and as the law pertaining thereto is equally applicable to telegraph circuits, it would seem desirable in the latter connection that, for each of the important systems in use, a KR

value should also be found that would serve as a standard for determining their working capacities and the distances through which these systems could be worked direct.

In the absence of any data upon the subject, the following may be interesting as affording at least an approximate idea of the efficiency limitations imposed by the KR law as applied to quadruplex working in one particular instance.

Some time ago the writer was called upon to make a test, over the Western Union lines, of the 300-pound copper wire (868 miles in length) between New York and Chicago, for the purpose of ascertaining whether, in view of its low mileage resistance, it could not be operated as a quadruplex circuit direct—that is, without the aid of a repeater in circuit.

The test was made under highly favorable conditions, the weather being fine at all points along the line, while the inductive interference from neighboring wires was comparatively slight, owing to the particular day and hour of making the experiment. The type of instrument used on the "No. 2 side" was that known as the Freir self-polarizing relay; the potentials employed being 360 volts at Chicago and 320 volts at New York. The value of Chicago's current was 19 milli-amperes from the "short" end and 57 milli-amperes from the "long" end; the latter developing in the New York instrument an amount of magnetism considerably in excess of that ordinarily obtained in practice, inasmuch as the average full-working current on a quadruplex circuit does not exceed 45 milli-amperes.

Despite the favorable conditions, and notwithstanding the fact that the apparatus was adjusted to the highest degree of delicacy at both ends of the line, it was found impossible to secure satisfactory working signals on the number 2 side when the distant polechanger was in operation. The effect of the "reversals" upon the second side relay cut down its working margin to an extent never before observed in the writer's experience a result which apparently demonstrated that the advantage gained by the new wire, in respect to its low mileage resistance, was more than counterbalanced by the detrimental action arising from its increased inductive capacity.

It would appear, in fact, from the distance involved and the amount of surface exposed that the absorptive properties or condenser-like action of the conductor had increased in much greater ratio than the resistance of the wire had been decreased, and, as a consequence, the current waves became unduly retarded. This retardation was sufficient in amount to prevent the number 2 relay—after each "interval of no current"—from becoming energized with that rapidity and intensity necessary to counteract the tendency of its retractile spring to open the armature and thereby mutilate the signals during the aforesaid "intervals" or periods when no magnetism is created in the receiving apparatus.

With a view to determine as closely as possible the KR conditions of the circuit, measurements were taken, which showed that $K = 13.4$ microfarads, and $R = 2{,}682$ ohms, thus making $KR = 35{,}938$; a numerical value so much in excess of that of the regular successful quadruplex circuit as to clearly account for the difference in results obtained.

When the circuit was divided and repeatered at Pittsburg there was no difficulty whatever in operating all four sides of the system, although in this case the full strength of Pittsburg's current did not amount to more than 41 milli-amperes (16 units less than that received from Chicago), which current, however, afforded a margin amply sufficient to allow a considerable range of adjustment on the number 2 side without affecting the quality of the signals during the distant reversals.

The KR value of the circuit under these altered conditions was estimated at about 10,500, so that the following results may be said to have been fully established:

(1) An excellent working quadruplex circuit when KR = 10,500.

(2) An impracticable working quadruplex circuit when KR = 35,938, and between these two values are, of course, to be found the good, bad and indifferent grades, as well as the limiting figures representing the successful working quadruplex circuit.

According to the KR law, the speed of the current wave through wires of the same length varies inversely as the product of the inductive capacity and the resistance of their conductors. In wires similar in all respects except length the speed of a wave in each is inversely proportional to the squares of their respective lengths, so that the carrying capacity of a wire of a given length ought to be four times as great as that of a similar wire extending through twice the distance.

As a matter of fact, the actual working capacity of a circuit divided in this way is not strictly in accordance with this rule—for reasons that need not be discussed here—but the applications of the rule nevertheless affords a clear indication of the advantage of repeatering a long telegraph circuit, the KR value of which will only be that of its longest section.

From these and other considerations the adaptability of the law to ordinary telegraphy will at once be apparent, and it may reasonably be inferred that the determination of the KR constants for aerial telegraph lines would prove as advantageous in this particular branch of electrical science as in those of telephony and cable working.

UNIQUE SYSTEM FOR ORDERS.

E. R. Harding, Chicago manager for the Holtzer-Cabot Company, has installed in his office a unique system for keeping in touch with his sales. Hanging on the wall are maps of the western and central states and a small card in which are stuck a number of pins of assorted colored heads, possibly a dozen of each color. These colors each represent a different line of goods manufactured by the company.

When the mail is opened in the morning Mr. Harding takes the orders, steps to the maps, selects the pins representing the goods ordered and inserts the pins in the maps, near the towns from where the orders for the goods came.

"After a month or more," said Mr. Harding, "I will be able to tell at a glance what sections of my territory need more attention than others, and will govern myself accordingly. The plan is very simple, and in cases where a watchful eye on the field is desired, cannot be excelled. Our business is constantly increasing and is fully up to expectations at the present time."

A TELEPHONE MAN'S TROUBLES.

Editor of TELEPHONY:—I think TELEPHONY the best trade publication that comes to my office and I enclose amount for another year's subscription. I gather a great deal of valuable information from your paper, and as a telephone man's troubles are manifold and varied, I always compare notes and find many problems fully explained. For instance, our electric light company had a primary wire connected by drunken workmen on a transformer to a secondary wire and it took them a long time to find the trouble, although I repeatedly called their attention to it and the possibility of such a connection or cross. As long as it lasted some of the telephones could hardly be used at night. In another case we had to send a man twenty miles to take a key off a telephone and a few days later to take some cigars wrapped in tinfoil off a telephone on our long distance line. As the line would be out only at a certain time in the evening and be all right next morning and during the day, it took us some time to find the trouble, if it may be called such. I am trying now some plans to avoid induction on ground lines.—A. J. STEIN.

XUM

Is the Telephone Making Us Left-Eared?

PERRY L. SISSONI

THERE has of late appeared much in print regarding the almost unanimous custom which prevails among telephone users of placing the receiver to the left ear when in the act of telephoning, and the assertion has been repeatedly made by those who have given the subject consideration that the telephone is making of us a left-eared race. That the declaration is well founded may be easily proved by any one who cares to investigate. All one has to do to demonstrate the correctness of the claim is to watch a public telephone for an hour or so. It will be observed that every person who uses the telephone will place the receiver to the left ear. Or take the pains to notice any number of business men as they sit at their desks and transact their business over the telephone. You will discover that invariably they use their left ear to hear what the man at the other end of the line is saying.

Visit some telephone exchange and watch the pretty exchange girls as they deftly pull out a plug and in sweet tones say, "Number, please." You will at once notice that nineteen out of every twenty operators have the receiver so arranged that they will hear entirely with their left ear. What is the result of this constant use of the left ear? Is it not gradually making of us a "left-eared" race of people? Has not the telephone created a new condition among the strenuous American people—that of "left-earedness"?

Such would seem to be the case, for whenever new telephone instruments are constructed the receivers are always made to hang on the left side, so accustomed have the people become to using their left ear exclusively in talking over the telephone. All this has undoubtedly created a race of "left-eared" people, for having acquired the habit of using the left ear altogether, it has been discovered that it is more sensitive than the right ear and is better fitted to receive the sound waves as they are transmitted through the delicately constructed telephone instruments. In fact, the left ear has been educated until to-day expert users of the telephone have become as generally "left-eared" as they are right-handed. And a "right-eared" person is as uncommon, and indeed even more so, as a left-handed person.

Upon the left ear reliance is placed for feats of operating for which the less-trained right ear lacks the necessary acuteness. There is no doubt but that it stands the brunt of the long stretches of continuous work by the girls at central much better than would the right ear.

"There is certainly such a thing as the telephone ear," declares Miss Weist, directory clerk of the New Telephone Company at Indianapolis. "And it is unnecessary to say that it is the left ear," she added, "for practically every girl on the exchange uses her left ear exclusively."

How far the evolution has advanced in the production of a "left-eared race of people," specialists in the study and treatment of the ear are not entirely agreed, for they are now awaiting the results of professional research and scientific investigation. Inquiry among the aurists of Indianapolis and other cities proves that the subject is one in which they are interested, since they recognize the possibilities of the evolution, while confessing their present inability to measure the extent.

"The cultivation and constant use of one ear," said Dr. S. A. Johnston, an ear specialist of the Indiana metropolis, "in excess or advance of the other is not an impossibility. The ears are separate organs, each being dependent on a different lobe of the brain. The use of one ear constantly for a special purpose must undoubtedly increase its efficiency for that and similar uses, though I am of the opinion that the constant use of one ear for a number of years will tend to increase the thickness of the drum of that ear, the result of which will be partial deafness in that ear. I have no data from which to speak authoritatively as to what degree this has been accomplished by the constant use of the left ear in receiving telephone messages. Official study has not as yet been made, for the telephone is of recent invention and has come into such general use only within the past few years. The proper place to begin an inquiry would of course be among the employes of the telephone companies."

Another aurist of the same city said he had as yet never heard of a telephone girl having been treated for injury arising particularly from the long and constant use of her left ear in answering calls. But he admitted that he would not be surprised if cases of this nature would become quite common during the next few years and that they would increase rapidly from year to year.

"Yes, the vast majority of our girls use their left ear," declared an official of the New Telephone Company, "but this does not seem to me to be a detriment to them. Even if it should become a racial characteristic, I think it is really a valuable acquisition, for while developing one ear it does not do so at the impairment of the other."

The operators themselves are all alert to the fact that they are really "left-eared." But they are not especially worried about it, they say. "I can place four thicknesses of a handkerchief between my left ear and the receiver and hear as well as I can with my bare right ear," said one of the girl operators of the New Telephone Company.

"It tires me to use my right ear," said another. "I must be at such a constant attention when holding the receiver to my right ear that the strain makes me decidedly nervous."

"I am really as much 'left-eared' as I am right-handed," declared still another operator of the New Telephone Company. "My left ear is quicker and more accurate than my right for all purposes. It was not so when I began, however. Now I change the receiver to my right ear only when the calls are light and I simply want a rest for a few moments."

To obtain an idea of just how much we are getting to be a "left-eared" race through the daily and constant use of the telephone it is only necessary to give a few statistics with regard to the number of people who employ the use of the telephone every day. The daily average of calls from users of the telephones in the city of Indianapolis is 142,000. At each of these conversations two persons talk over the wires. Thus 284,000 persons are engaged daily in conversations over the telephone. These talks will average one and one-half minutes each.

If one person transmitted all of this talk he would be steadily engaged in vocal exercise for 710 days, talking night and day or just two years of constant talking. Or, if he confined himself to a twelve-hour day he would be required to talk for just four years before he would finish all the conversation that takes place daily over Indianapolis telephones. Surely this amount of news would keep the gossips busy for many and many a day.

Not only is all of this sound poured into the straining left ears of Indianapolitans to the utter exclusion of their right

ears, but over 200 private wires extending from residences to offices and from stores to factories, and also in several hotels and apartment houses where private telephones are installed, are also used probably 1,000 times a day.

The New Telephone Company of Indianapolis has in operation over 8,000 telephones. From these telephones over 100,000 daily calls originate, 200,000 persons engaging in conversation throughout the day. Records kept by the company show that from 9 to 10 o'clock in the morning is perhaps their busiest hour, although the number of calls sent in hourly from 1 o'clock until 4 in the afternoon is practically as large.

The New Telephone Company has a total of 8,583 telephones in daily operation in the city, said Harry C. Goldrich, the company's chief electrician. From these telephones an average of 102,660 calls come in each day, or twelve calls for each telephone. Since, at each call, two persons talk, 205,320 people converse over the new telephones daily. If no one in the city talked more than once this means that every inhabitant of Indianapolis would use the new telephone once every day of the year.

To answer this vast number of calls promptly and satisfactorily 142 operators are employed by the company at its main exchange.

The average number of hours which each girl operator works every day is eight. Some of these girls can make as high as 200 connections in an hour.

From these statistics it can easily be seen that the daily education of the "telephone ear" constantly goes on and on, and, if one chooses to follow into the realms of speculation, a "left-eared" race of beings is certainly being evolved. The time will soon come when we will hear as much about the "keen left ear" as we do of the "strong right arm," for "left-earedness" is certainly a racial characteristic among the strenuous American people of to-day.

HEARD ON THE PARTY LINE.

LISTENING? NOT "CENTRAL."

"I'll bet you a dollar," said Brown, "that our 'hello girl' hears everything we say over the telephone."

"How'll you prove it?" asked his partner.

"I'll show you," answered Brown.

"No. 483," he called. "Hello! Hello! Is this you, Kate? Well, I just wanted to tell you that—central, will you please stop listening?" he broke in, interrupting himself.

"I'm not listening!" answered central, indignantly.

THE REASON WAS SIMPLE.

A breezy individual from the Windy City drifted into a New York hotel and used the public telephone to talk with a friend in Brooklyn. When he was through he offered the young woman at the switchboard ten cents.

"Twenty cents, please," said she.

"Twenty cents!" he shouted, indignantly; "twenty cents! Why, in Chicago we can telephone to h—l for ten cents."

"Yes," responded the operator sweetly, "but, you know, that is in the city limits."

WHY GOLDIE LOST HER BET.

Miss Goldie Bell, a pretty telephone operator of Indianapolis, lost a bet of a box of gloves and is the heroine of a little romance. About three months ago, talking of strange happenings with a young man employed in one of the large bakeries of that city, the remark was made that one never could tell when one would see a familiar face unexpectedly, or find a name somewhere under extraordinary circumstances. The young man bet Miss Bell a box of gloves that if he put her name and address on a cracker made in the factory she would hear of it in six months.

"Is this Miss Goldie Bell?" asked a voice over the telephone at her home the other night. Assured that it was, a masculine voice at the other end of the line said: "Well, you don't know me and I don't know you, but I have a strange thing to relate if you will listen. I was dining with a gentleman in the cafe of the Waldorf-Astoria in New York. We had ordered soup, and the waiter brought us a dish of large, thin and perfectly smooth crackers. On one that I picked up was written, 'Miss Goldie Bell, Indianapolis, Ind., New Telephone No. ——.' My friend wagered me a bottle of wine that I would find the Miss Goldie Bell in Indianapolis if I should try when on my next trip there."

"Oh, did you ever!" gasped Miss Bell. "I have lost my bet." She paid it.

A TELEPHONE TEST.

The telephone bell in an uptown residence rang a few evenings ago and a young woman who was expecting a call, rushed to answer it, being sure that one of her admirers had called her up.

"Is this ——?" demanded a voice, repeating the number of the telephone in question.

"Yes," replied the girl.

"Well," continued the voice, "we are testing the wire. Will you please draw a long breath and say very plainly, 'I will be good?'"

She obeyed. "I will be good," she said.

"A little slower and a little more distinctly, now, please."

"I—will—be—good," said the young woman, trying her best.

"No, that's not right at all," corrected the voice. "We must fix that wire, I guess. Now, make one more extra effort and say it again."

The girl caught her breath. "I will be good," she shouted.

"You will, will you?" laughed the voice. "Well, I'm glad to hear you say so. You were decidedly unpleasant the last time I called."

CARD GAME BY TELEPHONE.

"Did you ever try to play cards by telephone?" smilingly queried George C. French, exchange manager of the Wisconsin Telephone company, says the Milwaukee *Sentinel*. "Never? Well, I have been experimenting with it, and, despite the fact that it has some drawbacks, it is highly interesting and ought to become a fad.

"My wife and I planned to go visiting a few nights ago, but an evening of rain spoiled our preparations. That was where I got busy, and after making a few preliminary plans I decided that we ought to be able to have a visit by telephone, even to including the playing of whist.

"I have a desk telephone in our dining room, and so I soon had a table arranged and brought out a pack of cards. Then I called up my friend by telephone, and he at once fell in with the plan. He got out a deck of cards and a table, and then I dealt our deck face upward, calling out the cards that I dealt to each, having first provided imaginary seats for my friend and his wife. As I called out the cards to him he picked these cards out and dealt them to correspond on his own table. Of course we were under the disadvantage of knowing what cards every player held, but the novelty of making each move by telephone made this a minor matter. We would play our cards in turn, always announcing the card we played, and in this way the game went on as if we were sitting opposite each other at one table instead of being about three miles apart and playing by wire. I don't think you could play poker in that way, however."

First Telephone Girl: "What did Belle say when you told her your engagement was broken?"

Second Telephone Girl: "Oh, she said it only meant another ring off."—*Electricity, London.*

NEW SELECTIVE LOCKOUT TELEPHONE SYSTEM.

In the selective lockout telephone system herewith illustrated—the invention of A. Meinema—something radically different from previous efforts is shown. By referring to the illustration it will be seen that the step-by-step, or mechanical, system is used. It can be seen at a glance, by any practical telephone man, that the device is one of extreme simplicity, employing but one relay in the entire instrument. The relay is made of the finest material obtainable and is of sufficient power to overcome any friction

NEW SELECTIVE LOCKOUT SYSTEM.

caused by ageing or corrosion of the movable parts. The step-up device is made from tough sheet steel and rods and the wearing parts are of hardened and tempered tool steel, thus insuring long life of the device. All contact strips are of best German silver, platinum pointed and mounted on polished hard rubber, all spacing blocks and insulation strips also being of hard rubber.

Instead of making the contacts by rotation of the ratchet wheels at the different subscriber's telephones, as has been customary in the devices so far patented, only the grounded ringing circuit is so closed in this system. When in the normal position, any telephone can be cut in by the mere act of the subscriber taking the telephone receiver from the hook lever. To accomplish this, a universal short projecting lug is provided, which is in the same relative position at all normal telephones. After the stepping-up process has been started, it is impossible to get more than one projecting lug in selective position at the same time. The stepping up of the ratchet wheel causes the longer lug to be carried up to the selective position, where it automatically presses the ground spring against one line spring. The local bell being in series with the ground connection, the operator is now able to call up the wanted party over one side of line to the ground. After the selected party has been called, the line circuit is closed and the ground circuit automatically opened, by the called subscriber removing the telephone receiver from the hook lever. When the receiver is taken down, the lever, in raising up, imparts a bodily movement sideways to the carriage containing the ratchet wheel, which presses the line contact springs together and latches same. In this operation the projecting lug again comes into play, as the movement of the carriage is not sufficient to latch the line contact springs without the aid of the intervening lug. This provides lockout for the not wanted telephones, as it is impossible to close the line circuit except while the telephone is in either a normal or selective position. The calling party calls up central by the usual process of ringing up and asking the operator for the party desired.

A three-bar generator is used for calling, as in this system there are no by-passes for the current to dissipate itself, only the switchboard signal being dropped by the ringing up. An automatic circuit breaking and closing switch is provided at the switchboard for the proper number of pulsations of current over the line and through the bridged relay. To restore the telephones to the normal position, the operator presses the lever in the opposite direction from selecting, which causes current of an opposite polarity to be sent over the line, causing a reverse movement of the relay, which releases the line spring and ratchet wheel. In pressing the line contacts into circuit, the hook lever makes a passing connection with the movable carriage, allowing same to fall back to its normal position after latching the line contacts, thereby removing the friction from the ratchet wheel and allowing the operator complete control of the line at all times, regardless of receivers being on or off the hooks. Only three make and break contacts are used in the entire telephone, one each for the line, local transmitter battery and ground for ringing. All the contacts are made by pressure applied by the hook lever, insuring absolutely positive contacts without putting friction on the step-up relay and thereby preventing same from operating.

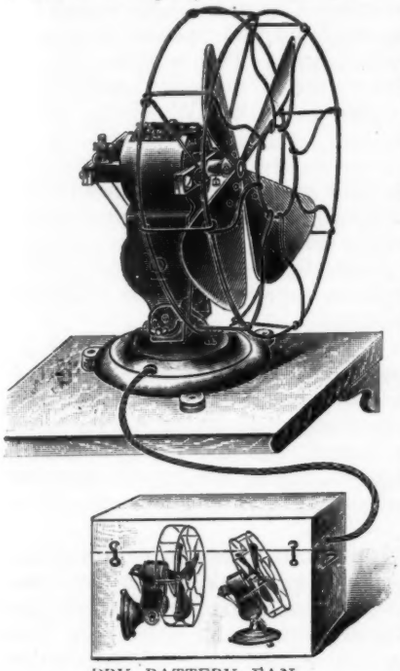
Both the relay and step-up device are mounted on a cast iron base, thus insuring absolute alignment of the parts and preventing any strain upon the mechanism through warping of the woodwork of the cabinet. The entire device goes into a standard size of telephone cabinet of the compact type, making a handsome instrument. The telephones can be purchased either complete or without transmitter and receiver, for customers who wish to have but one make used on his system. The regular equipment consists of our special long-distance transmitter and receiver and three-bar generator, also two cells of Columbia dry battery.

The cabinets are of well-seasoned, highly polished oak and all contacts and binding posts are inside the case, preventing any accidental short circuiting of line or relay. To prevent any tampering with the mechanism each cabinet will be provided with a seal.

The telephones are fully guaranteed by the company and any defective parts will be cheerfully replaced. The selector switch for operating the line is of a circular type, very handsome and compact, and is operated by merely pushing a small lever around to the desired number. No further operation is necessary, the lever going back automatically to the normal point. The telephones will be made and sold by the Selective Lockout Telephone Manufacturing Company (not incorporated), Chicago, Illinois. Factory, corner Union and Fulton streets.

DRY BATTERY FAN.

Under the title of "A Cooling Breeze," the Ewing-Merkle Electric Company, St. Louis, has issued an exceedingly attractive folder relating to a dry battery fan outfit, which they are offering to perspiring humanity, complete in all details, as shown in the accompanying engraving, at a price of $15.



DRY BATTERY FAN.

The folder is illustrated by pictures taken from life, especially posed for in the artist's studio by sleeping beauty of the gentle sex, and a customer of a barber shop being shaved in close enough proximity to a fan to have a thoroughly satisfied and pleased expression.

This efficient, attractive, and low-priced fan takes current from portable batteries and is easily moved as occasion requires. The fan throws a good breeze directly forward; can be tilted to any angle either up or down, or made into wall bracket. It is operated by twenty cells of dry batteries and will run 200 or 300 hours if used three or four hours per day. If worked continually, not allowing the batteries to recuperate, the length of life will be reduced. Where constant work is necessary, as in a sick room, etc., it will be more economical to alternate with extra sets of batteries.

The box is wired complete, has a switch to open the multiple connections, and a diagram is furnished showing how to put in the cells and connect. The weight of the outfit is four and a half pounds, and boxed complete, eight pounds.

BISSELL COMPANY'S NEW LINE.

The F. Bissell Company, Toledo, Ohio, has added to its list of specialties, novelty potheads, sleeves, terminal heads, etc., for telephone cable work. It has purchased from the New Haven Company all patents, special machinery, goodwill, merchandise—finished and unfinished—pertaining to this business.

In its circular the Bissell Company advises that it will naturally take some little time to get this business running smoothly, but it has put considerable energy into it and orders are now being filled promptly. Advertising will be liberal and explanatory and the arrangement of lists will be adjusted shortly.

In addressing themselves to the trade, the manufacturers lay particular stress upon customers forwarding necessary information when giving specifications. It is necessary to know the number of pairs in the cables to be joined as well as the outside diameter of the lead sheath. The diameter and length of sleeve may be specified or left to the manufacturers' judgment, but the first two items are positively necessary before an intelligent selection can be made.

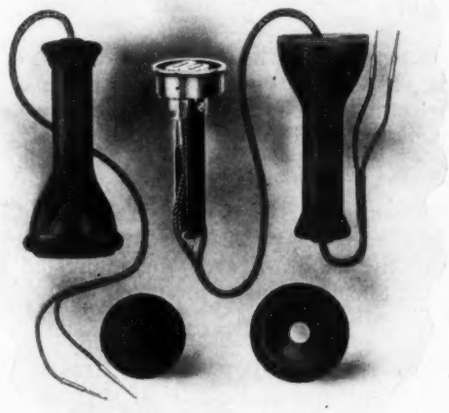
The necessity for this data is obvious; cables run all the way from No. 19 to No. 22 gauge of conductors, and in static capacity they vary from .08 to .12 and even more, and the lead also varies from three sixty-fourths to one-eighth inch.

All of these items affect the external diameter and this requires different sizes of outlets from the potheads and sleeves, so if customers order by pairs it means nothing to the manufacturer, and if he takes chances, he runs the risk of offending the customer.

Hereafter these devices will be put out under the name "Security" to conform with the trade name of other specialties manufactured by the F. Bissell Company, and which are so well known under that name. Owing to their very advantageous location and special new facilities the manufacturers advise that they will be in position to serve the trade with these popular articles much more promptly and satisfactorily than they have been able to procure them heretofore.

WILLIAMS' BI-POLAR RECEIVER.

The accompanying cut illustrates a concealed cord bi-polar receiver, recently put on the market by the Williams Telephone and Supply Company of Cleveland, Ohio. It embodies all of the essential features of their regular receiver,

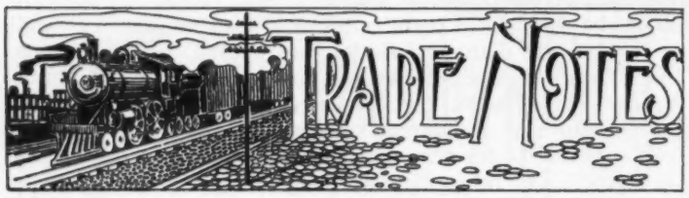


WILLIAMS' BI-POLAR RECEIVER.

which has become well and favorably known among the trade and users, on account of its permanent adjustment under all changes of temperature, as well as its clear and sensitive receiving powers. Permanent adjustment is secured by using a metal adjustment cup, the adjusting plate seating against a metal back and the two metals expanding and contracting together. A long permanent magnet is used, giving increased magnetic flux and a clearer tone.

An especial advantage is that any common cord can be used in this receiver, whereas most of the concealed connection receivers use a special terminal trip on the cords. The receiver is centrally hung and all strain on the cord is taken up by a ring fastened around the head of the magnet and attached to a hook in the cord, all strain being taken off the terminal tips. This is an important feature, as the cord on other makes of receivers often cuts through and short-circuits the instrument.

XUM



THE TELEPHONE TRANSMITTER GUARD COMPANY, Chicago, has been licensed to incorporate.

THE GEMMILL TELEPHONE AND ELECTRIC COMPANY will erect a factory building at Barberton, Ohio.

THE STROWGER AUTOMATIC TELEPHONE EXCHANGE, Chicago, has declared the regular semi-annual dividend of fifty cents a share, payable July 1.

DUKE M. FARSON & COMPANY, New York city, are offering $100,000 of Ottawa, Ill., Home Telephone Company first mortgage five per cent bonds, maturing in nine years.

THE CENTRAL ELECTRIC COMPANY, Chicago, has issued a new telephone catalogue and price list No. 21. This catalogue is very complete and should be in the office of every telephone manager.

THE MARION INSULATING WIRE AND RUBBER COMPANY, Marion, Ind., is putting on the market a superior line of rubber insulated wire. Particulars can be had upon application to the company.

W. F. BRENNAN & COMPANY, electrical engineers, Chicago, have been awarded the contract for the district cabling for the Illinois Tunnel Company, which is the corporation owning the new Chicago Automatic Telephone Company.

THE LEWIS LUMBER AND MANUFACTURING COMPANY, Hattiesburg, Miss., has opened a sales office in Cincinnati, Ohio. The company reports that it is filling large orders for long leaf yellow pine cross arms, oak and locust pins, oak brackets, etc.

THE CONTROLLER COMPANY OF AMERICA, Chicago, has issued a booklet, entitled "Deadheads vs. Dividends," which should be in the hands of everyone interested in knowing how to run a telephone plant for profit. The book will be mailed free to all applicants.

THE VOUGT-BERGER COMPANY, La Crosse, Wis., manufacturers of telephones and electrical supplies, had planned to move to Minneapolis, but has now decided to remain in La Crosse, as a wealthy resident of Canada has offered to put $25,000 into the company.

THE MCROY CLAY WORKS, Brazil, Ind., and Chicago, keeps up the good work of distributing monthly blotters that blot. Its June edition was brightened by a cheery poem, "Talk Happiness." The McRoy blotters besides being handy help to scatter a lot of sunshine.

THE FIBRE CONDUIT COMPANY, Orangeburg, N. Y., and Chicago, is sending out an interesting series of mailing cards, showing on one side a picture of the company's factory and on the other illustrations and descriptions of underground construction as done with fibre conduit.

THE OHIO VALLEY GLASS COMPANY, Chicago, manufacturer of glass insulators, is calling the attention of the trade to its products in this line. It is maintained that these insulators are especially noted for their strength and toughness and are guaranteed to be standard in every respect. Particulars may be had on application to the company's office at 1501 Monadnock Building, Chicago.

THE SUMTER TELEPHONE MANUFACTURING COMPANY, Sumter, S. C., owing to increasing business, has doubled its capital stock, which is now $100,000. A new building has been added and new machinery installed, costing nearly $50,000, which has been paid out of the surplus profits.

W. S. SEAMAN & CO., Milwaukee, Wis., manufacturers of sound-proof telephone booths, have issued a new catalogue and state that they have a special proposition of exceptional interest. Those interested in telephone booths are requested to communicate with the Seaman company.

THE IMPERIAL CONSTRUCTION COMPANY, Charleston, W. Va., has been incorporated to build and operate telephone, telegraph and electric light plants. The capital stock is $50,000, and the incorporators are Homer P. Dixon, E. P. Lowler, James E. Furguson, Harlan W. Gillis, all of Charleston.

H. M. DEAVITT, 159 La Salle street, Chicago, chemist for a number of leading telephone manufacturing concerns, is sending out a mailing circular calling attention to his facilities for doing all kinds of analytical work. Mr. Deavitt is making a specialty of telephone experimental and analytical work and invites correspondence.

THE STANDARD VITRIFIED CONDUIT COMPANY, New York city, has issued an artistic leaflet, describing its multiple duct conduit and illustrating its method of laying. This company claims to have the largest conduit factories in the world and numbers amongst its buyers the largest electrical firms and contractors in the country.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, has issued a new folder, describing its International Express type of switchboard, together with the International key for combined ringing and listening. This company guarantees its apparatus, and will replace any that is defective in workmanship or material.

THE DE VEAU TELEPHONE MANUFACTURING COMPANY, 27 Rose street, New York city, has issued a novel postal folder calling attention to its telephone apparatus. It mentions in particular the installation of De Veau telephones in the White House at Washington, and states that the next President will be a constant user of this apparatus.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., has secured the contract for the complete equipment of the Newark Telephone Exchange, Newark, N. Y. The company will install a common battery visual signal board with double lamp supervision. The power plant will be storage batteries with ample capacity for a large increase.

THE ELECTRIC SUPPLY AND CONSTRUCTION COMPANY, Columbus, Ohio, has the contract for installing a telephone system in the Carnegie Library of that city. The specifications call for De Veau apparatus. This company is in the field for all classes of telephone construction from exchange installation down and has a reputation for reliability and thoroughness.

THE WYCKOFF PIPE AND CREOSOTING COMPANY, Inc., Stamford, Conn., reports that the public service corporation of New Jersey has purchased from it several miles of "Wyckoff" creosoted conduit for its construction work this season, and the Bell Telephone Company of Philadelphia, Pa., has bought over twenty miles of "Wyckoff" creosoted

conduit for its underground work in Philadelphia, together with a large amount of creosoted lumber to lay on top of the conduit to protect it.

THE IMPERIAL CONSTRUCTION COMPANY of Charleston, W. Va., has been incorporated under the laws of the State of West Virginia, for the purpose of doing general telephone and power construction, by Homer P. Dixon, as president; James E. Ferguson, vice-president; E. P. Lawlor, secretary, and others. All the officers of this company are practical telephone engineers.

THE WARNER ELECTRIC COMPANY, Muncie, Ind., is distributing an instructive booklet, descriptive of its popular pole changer. The Warner pole changer is widely recognized as a simple, durable, effective, ornamental and economical device for ringing telephones. The new booklet, descriptive of its merits and operation, can be had upon application to the company.

THE EUREKA ELECTRIC COMPANY, Genoa, Ill., now has handsome offices and salesrooms at 619 Monadnock Building, Chicago, where visitors will be accorded a hearty welcome. A full line of apparatus will be kept on display. The company reports the greatest business in its history. All correspondence addressed to either the Chicago or the Genoa office will receive prompt attention.

THE NATIONAL CONDUIT AND CABLE COMPANY, New York city, manufacturer of bare copper wire, weatherproof wires and cables, and lead-covered wires and cables for telephone, telegraph, electric light and power work, has issued its June copy of "Copper Gossip." This leaflet contains interesting information in connection with the copper market, etc. Leaflets will be sent upon request.

THE KNICKERBOCKER CONSTRUCTION COMPANY, 15 Cortlandt street, New York city, has been organized by Ellis B. Barker and W. M. Anthony, New Haven; L. B. Wheeldom and J. W. Cushing. It will build conduits, aerial and underground cable lines, and install submarine cables, and all other kinds of electrical construction. This company is the sole licensee of the Grinnell patent cable hauling machine.

A. BUSHNELL, Kansas City, Mo., who has been in the lumber business since 1886, makes a specialty of cypress poles creosoted and treated with chloride of zinc. Mr. Bushnell claims that a pole treated in this manner will outlast any two poles not so treated. Mr. Bushnell has supplied many of the leading consumers in the west and southwest and will be pleased to give full particulars to those in the market for poles.

THE DUNCAN ELECTRIC MANUFACTURING COMPANY, Lafayette, Ind., has issued a bulletin, describing the Duncan integrating wattmeters for direct current, which notes in detail the construction and working of these instruments. Something new in the construction is the visual bearing, which permits of the lower end of the shaft or spindle point and the jewel bearing being inspected while the meter is in operation.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Chicago, and Rochester, N. Y., has issued Bulletin No. 11, which supersedes Bulletin No. 4. This bulletin deals entirely with telephone instruments and accessories, special attention being given to its four-party selective signaling system, the new type No. 4 transmitter, and the two styles of receivers the company manufactures. This bulletin is gotten up in a most elaborate and artistic manner and is bound in the loose leaf style, so that additions can be inserted as received. Besides describing the apparatus in a most complete manner, diagrams are furnished of important connections.

THE ELECTRIC CONTROLLER AND SUPPLY COMPANY, Cleveland, Ohio, has prepared for distribution at the World's Fair nine bulletins describing some of its more important specialties, namely, magnetic switches and clutches, lifting magnets, solenoids and electromagnets, controllers, brakes, resistance units and electrical fittings. The pamphlets are bound in tinted covers, presenting an unusually attractive appearance.

THE ATTICA FOUNDRY AND MACHINE COMPANY, Attica, Ohio, has issued a neat booklet descriptive of the Blaine Land Anchor. The illustrations show the anchor in position and method of placing same in ground. The company claims the "Blaine" is the cheapest anchor and best method, as it pulls against the solid earth from the start. The book gives a clear idea of the anchor and will be mailed to anyone upon application.

THE F. BISSELL COMPANY, Toledo, Ohio, has recently received some nice orders from the United States government for its cable sheath knives which were illustrated in our issue of May. The Bissell company has struck a keynote of success in the advertising field with its latest novelty in the form of an instruction card for telephone users. Telephone managers should send for a package, which will be mailed free upon request.

THE AMERICAN STEEL AND WIRE COMPANY, which has sales offices in all the large cities, is sending out a handsome 185-page illustrated catalogue dealing with electrical wires and cables, which should prove of value to all engaged in the telephone business. It contains also interesting tables and rules relating to construction and much else that is worthy of perusal. Prospective buyers will be furnished the catalogue upon application.

THE W. J. BARR MANUFACTURING COMPANY, Cleveland, Ohio, has issued a booklet describing its cast iron cabinets for interior and central energy telephones. The cabinets described and illustrated in the booklet are indestructible, beautifully finished and serviceable. This company is one of the most progressive in the field and has a number of new designs in transmitter arms, which will interest telephone men. Correspondence is invited.

MILTON M. SMITH, Evanston, Ill., recently received another large order for his well-known Smith Marlin cable hangers. The order came from J. F. Butterfield, electrical contractor, Chicago. Mr. Butterfield has used the Smith Marlins before and knows what they are. He will use 30,000 of this order on the Independent telephone system at South Bend, Ind., the 50,000 which he used there last year having given complete satisfaction.

THE AMERICAN ELECTRIC TELEPHONE COMPANY, Chicago, reports an extraordinary demand for its magneto call type, self-restoring signal switchboard. This includes drop shutter, visual and lamp signaling systems. It has also recently secured orders and built toll line switchboards for a number of long distance telephone companies, among which may be mentioned the following exchanges: St. Joseph, Mo.; Albany, Mo.; and Excelsior Springs, Mo.

THE FARR TELEPHONE AND CONSTRUCTION SUPPLY COMPANY, Chicago, has issued a very attractive folder entitled, "How to Build Farmers' Lines." Seven illustrations are given, taken from photographs of actual construction, showing the best methods to employ. Specifications as to the size of poles, method of setting, stringing wire, method of in-

stalling instruments, and some figures as to cost. All those interested in this class of work should secure a copy of this pamphlet.

THE CONNECTICUT TELEPHONE AND ELECTRIC COMPANY, Meriden, Conn., reports the most prosperous year of business in its history. They have moved into their new and modern factory and their 1903 models are perfection in their mechanical construction and finish. The company's prosperity is no doubt due to the high-class article they are making. Their products are the best that skill and money can produce. A large catalogue and various bulletins will be sent on request.

THE AUTOMATIC ELECTRIC COMPANY, Chicago, extends to all a cordial invitation to visit its headquarters at the St. Louis Exposition, Section 24, Palace of Electricity, where a large working exhibit of automatic telephone apparatus is installed and where two complete switchboards are in constant operation. Visitors will be courteously received and given an opportunity to acquaint themselves with the system which is in successful operation in many cities and towns of the United States.

THE WILLIAMS-ABBOTT COMPANY, Cleveland, Ohio, is preparing to move into larger quarters, where it will increase its working force about fifty per cent. This well known company is flooded with orders for telephones and telephone equipment this season. It is sending a folder to the trade illustrating and describing its new desk telephone and new cam hook switch. This folder and other late advertising matter will be sent free to prospective purchasers upon application.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., and Chicago, recently sold $10,000 worth of telephone cable to the E. H. Martin Telephone Company of Webster City, Iowa. Stockholders of the company recently voted to increase the common stock from $1,500,000 to $3,000,000. There is also outstanding $1,500,000 of preferred stock. A special dividend of 10 per cent has been declared on the common stock, to be paid in cash or in new stock.

THE COUCH & SEELEY COMPANY, Boston, has just issued an elaborate new catalogue describing its telephone apparatus, which includes everything from the subscriber's telephone to the switchboard and accessories. The catalogue is very complete and well illustrated and describes in detail each piece of apparatus with diagrams of connections. Switchboards and distributing frames are shown and also generating machinery for the ringing apparatus. Catalogue will be sent upon request.

THE HAZARD MANUFACTURING COMPANY, Wilkesbarre, Pa., has opened headquarters at 71-73 West Adams street, Chicago, and Robert H. Peet, who for three years past has had charge of the sale of insulated wires and cables made by the concern, has been made sales agent for its entire product in Chicago and western territory. With him will be associated as assistant Homer A. Wessel, Jr., from the factory. A large stock will be carried. The Hazard products have a fine reputation in the west.

THE DOUBLEDAY-HILL ELECTRIC COMPANY, Pittsburg, has issued in its general catalogue No. 4 of electrical supplies one of the most comprehensive volumes as to electrical apparatus given to the trade of late years. It is a massive volume of 1,068 pages printed on good paper in clear type and profusely illustrated with cuts of every class of electrical apparatus for which there is a market. In some of the instances the text is very full and useful. The owner of this catalogue is fortunate. To see it is to want it, and to obtain it means daily use for any busy central station manager, superintendent of isolated plants, telephone man or telegrapher.

THE SUMTER TELEPHONE MANUFACTURING COMPANY, Sumter, S. C., has recently issued Bulletins Nos. 34, 35 and 36 descriptive of its product. The first relates to the Sumter "Bull's-Eye" Express Switchboard; the second to its "S. T. M." intercommunicating telephones, central energy, and the third to its different styles of telephones. Each bulletin is profusely illustrated and shows to excellent advantage the high-class goods manufactured by this company. These bulletins will be sent to anyone interested upon request.

THE AUTOMATIC MONITOR COMPANY has been incorporated by Toledo capitalists for the purpose of manufacturing a device for measuring time consumed from the lifting of the telephone receiver from its hook by the subscriber until the operator answers the call, and also just how long the talk over the line lasts. The incorporators of the new company are: H. R. Ashbrook, Charles D. Miller, Morgan Levi, E. M. Taylor, D. A. Yoder and Sigmund Sanger. The device is stated to be the invention of E. K. Hertford of Washington, Ind.

THE S. H. COUCH COMPANY, Boston, has recently closed several contracts for telephone equipment, among which are the Lafayette Hotel, Portland, Maine, which calls for 140 telephones and a 140-line common battery board of its new target type. This replaces a previous equipment recently installed. Also orders for common battery boards for Worcester City Hospital, Worcester, Mass., replacing present system, and Hartford Carpet Corporation, Thompsonville, Conn., and a magneto board for Medfield Insane Hospital, Medfield, Mass.

THE MONARCH TELEPHONE MANUFACTURING COMPANY, Chicago, reports a great increase in sales over a year ago. This company manufactures every part of the telephone, both for wall and desk sets, and has recently added several new features which simplify the construction and still give the instrument practical advantages. The new Monarch desk set seems to supply a long felt want for a handsome, durable and efficient desk instrument. For full particulars, write to the Monarch Telephone Manufacturing Company, 14-16 South Clinton street, Chicago.

THE BRUNO-GROSCHE COMPANY, New York city, agents for the S. P. F. Carbolineum preservative, has issued a folder which contains, besides many letters from satisfied customers, a report of a test made by the German government, with a view to discovering the preservative qualities of Carbolineum. The result of experiments made with thirty-two pieces of wood, of which sixteen were treated with Carbolineum and sixteen were not, was that wood treated with S. P. F. was twice as strong as when not so treated. In consequence of this investigation, the German government will use it exclusively in all its line construction.

THE STANDARD TELEPHONE AND ELECTRIC COMPANY, Milwaukee, Wisconsin, states that since removing its offices and factory from Madison to Milwaukee business has greatly increased. Orders received during the months of May and June for Standard No. 120 magneto call switchboards of 50, 100, 300 and 400 lines, have been larger for those months than ever before. This new type of magneto switch-

board is extremely simple in its construction and is easily operated, particular attention being given to the mechanical construction and finish, as well as to the new electrical features it contains. Orders have also been extremely good for series, bridging and selective No. 25 compact telephones. An order from Messrs. Cochems, Lannier & Co., Shanghai, for nfty Standard No. 142 magneto instruments was recently filled, presumably for use of the Japanese forces now in the field against Russia.

THE LAMBERT SCHMIDT TELEPHONE MANUFACTURING COMPANY, Weehawken, N. J., recently shipped a 270-drop central energy switchboard and telephones to the Grand Hotel at Grand Hotel Station, N. Y. This company's latest catalogue comprises a description of the interior telephones which it manufactures. A novelty described is the automatic resetting switch, which is offered for speaking tube and interior telephone installations. Hotel systems and switchboards are illustrated and given descriptions. The company will send the booklet to anyone interested upon application.

THE SANDPOINT CEDAR COMPANY, LTD., Sandpoint, Idaho, reports the biggest business this season in its history. This well-known firm owns at the present time 5,000 acres of choice standing cedar and has material at twelve different yards. It has a staff of competent men who personally look after the cutting, inspecting and loading of poles. The Sandpoint company is handling large quantities of poles at the present time, is a thoroughly responsible firm in every respect and guarantees satisfaction to its patrons. It invites correspondence.

W. N. MATTHEWS & BROTHER, St. Louis, who are distributing agents for the celebrated Strombaugh guy anchors, say the reason these anchors are so popular is because they will ship them, freight prepaid, to any part of the country on thirty days' trial, with the privilege of returning at their expense if not satisfactory. It is needless to say that very few of these anchors are returned, as the first shipment in ninety-nine cases out of a hundred brings subsequent orders. Where satisfaction does not result it is almost invariably because the anchors are not used correctly.

THE LOCKE INSULATOR MANUFACTURING COMPANY, Victor, N. Y., made an exhibit at the recent convention of the National Electric Light Association at Boston in connection with its New England agents, the Pettingell-Andrews Company. The display consisted of an almost complete line of the Locke insulators, especially types of the high potential insulators for electric light work. This company publishes an excellently illustrated catalogue descriptive of insulators for all applications, which will be sent on request. The company is also making a comprehensive exhibit at the Electricity building, St. Louis Exposition.

THE ATTICA TELEPHONE COMPANY, Attica, Ind., has recently placed with Frank B. Cook of Chicago an order for his Type "L" iron frame distributing rack to be equipped with his No. 444 protectors having the self-soldering heat-coil. The distributing frame is equipped for 600 pairs, the company having recently discarded the old protective system. Among the other Indiana exchanges which have recently been equipped with Cook's apparatus are Worthington (which has the same style of frame with a capacity of 400 pairs), South Bend, Fort Wayne, Bedford, Franklin, Garrett, Brookston, Frankfort and La Fontaine.

THE NATIONAL ELECTRIC COMPANY, Milwaukee, has inaugurated a new department which will undoubtedly be greatly appreciated by those connected with the company. This comprises two pleasant dining rooms, a butler's pantry and a kitchen, the object being to supply dinner to those engaged in the executive and engineering deparments of the company at the company's expense. While there will be no charge to the employes for the dinners, the company frankly confesses that its motives are not entirely philanthropic; it is believed that this arrangement will result in closer touch, and consequently more efficient co-operation, between the various members of the executive and engineering staffs.

THE EWING-MERKLE COMPANY, St. Louis, is distributing a novel conceit in the way of a mailing card, advertising its well-known circular loom, which, it is claimed, possesses greater advantages than any other form of flexible conduit. The card is a work of art. On it is represented a fluffy fairy of a beauteous maiden, all in green and white, sunbonneted and with bare arms, sitting on a pier post at Cape May or some other old place angling for goldfish in the tide. The connection this has with Circular Loom is told in the opening announcement, "Fishing made easy by using Circular Loom." The Ewing-Merkle people are lucky to have such a dainty bundle of dry goods to advertise its wares. Come again.

THE NEW YORK INSULATED WIRE COMPANY, with offices in New York, Chicago, Boston and San Francisco, is sending out to its customers and prospective buyers a neat little advertising conceit in the form of a transparent paper fish, which, when placed on the palm of the hand squirms and wriggles like an angleworm taking a sun bath. In color the "fish" is a cross between a Red River salmon and a Grass Creek red-horse, and from the pulsation of its tail and the hang of its lower jaw the natural inference is that it belongs to the species *suckerino escapus,* which translated means, "the fish that got away." Anyway, it's all very flossy. A simple request will bring the fish man to your door with a free sample.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., has just completed an exchange at Fairport, N. Y., for the Inter-Ocean Telephone and Telegraph Company. A common battery system was installed. They are constructing a system in Charlotte and increasing the cable plant in Wellsville, Hornellsville, Waverly and Sayre, Pa. They have also commenced the construction of the toll lines from Buffalo to Jamestown; these lines to be first-class in every way, and all circuits to be of copper. They have just issued neat and attractive catalogues on its small exchange switchboards and telephones, which will be sent to anyone on request. The Century company report a steady increase in its business in Ohio and other central states.

THE STERLING ELECTRIC COMPANY, Lafayette, Ind., is furnishing additions and switchboard equipment for the following cities: St. John, Wash.; Wessington Springs, S. D.; Hamilton, Mo.; Chardon, Ohio; Roanoke, Va.; Johnson City, Ill.; Indianapolis, Ind.; Lorain, Ohio; Des Moines, Ia.; Hoopeston, Ill. The Sterling company is also furnishing its different types of protector apparatus for the following cities: Warren, Pa.; St. Louis, Mo.; Spirit Lake, Ia.; Alexandria, Ohio; Butler, Pa.; Tampa, Fla.; Johnstown, Pa.; Chardon, Ohio; Pittsburg, Pa.; Sedalia, Mo.; Flushing, Ohio; Buckley, Ill.; Kansas City, Mo.; Superior, Wis.; New Bremen, Ohio; Utica, N. Y. It is reported that the Sterling company is receiving orders for condensers of its manufacture at a rate of 5,000 a day.

THE STERLING ELECTRIC COMPANY is furnishing its different types of protective device to the following points: Newton, Ill.; Sparta, Wis.; Hoosick Falls, N. Y.; Chester,

XUM

N. Y.; Columbia, Mo.; St. Louis, Mo.; Atlantic, Iowa; Kansas City, Mo.; Indianapolis, Ind.; Portland, Ind.; Deposit, N. Y.; Lyons, Iowa; Tiffin, Ohio; Columbus, Ohio; Crosswell, Ohio; Utica, N. Y.; Vassar, Mich.; Atlanta, Ga.; Lincoln, Ill.; Bay City, Mich.; Papillion, Neb.; Sheboygan, Wis.; Novinger, Mo.; Cairo, Ill.; Columbus, Ind.; Neosha, Mo.; Lincoln, Neb.; Birmingham, Ala. The company is also furnishing switchboard equipment of its well-known single relay, common battery Bell type boards, for Attica, Ind.; Deposit, N. Y.; Elkhart, Ind.; Tiffin, Ohio; Charleston, Ill.; Lyons, Iowa; Ottawa, Kan.; Crosswell, Ohio; Boswell, Ind.; Novinger, Mo.; Buck Creek, Ind.; Burr Oak, Mich.

The Automatic Electric Company, Chicago, has just been awarded contracts to install its automatic telephone system in the cities of Battle Creek, Michigan, and Van Wert, Ohio, replacing manual systems. The Citizens' Telephone Company of Grand Rapids, Michigan, which replaced its manual exchange in that city with the automatic exchange last winter, is the owner of the Battle Creek system; and the Van Wert Telephone Company is the owner of the Van Wert system. The new automatic exchange at Battle Creek is to have a present installation of 1,000 instruments with an ultimate capacity of 10,000. The Van Wert exchange is to have a present installation of 925 instruments with an ultimate capacity of 10,000. The Automatic Electric Company furnishes complete central office and subscribers' equipment in each case.

Frank B. Cook has completed the shipment of a large distributing frame for the Automatic exchange of the Home Telephone Company of Los Angeles, California. This is what Mr. Cook styles his No. 444, with self-soldering heat-coils, and the frame is equipped for 4,875 pairs. He previously equipped the manual exchange of the Home Telephone Company with a frame having a capacity of over 10,000 pairs, using Cook's well-known No. 4 protectors. Mr. Cook has also recently filled large orders for his protective devices from the Pittsburg and Allegheny Telephone Company, and from the Kellogg Switchboard and Supply Company for their Louisiana Purchase Exposition exchange. A large order has also been received from Rome, Italy, showing that Cook's apparatus is well known in foreign countries, as well as in the United States.

The Swedish-American Telephone Company, Chicago, has recently contracted with the following named exchanges for their complete equipment: Farmers' and Merchants' Telephone Company, Monroe, Mo.; Kress & White Telephone Co., Riley, Kan.; Somers Township Telephone Company, Leverett, Illinois; Babcock Telephone Company, Chetek, Wisconsin; Polson Bailles Telephone Company, Cambria, Wisconsin; Farmers' Mutual Telephone Company, Larwill, Indiana; Assumption Mutual Telephone Company, Assumption, Illinois; Jamestown Telephone Company, Jamestown, Kansas; Mount Zion Telephone Company, Keystone, Indiana; James Telephone Company, Callao, Missouri; Kinderhook Switchboard Company, Kinderhook, Illinois; J. G. May Telephone Company, Olean, Missouri; Marion County Telephone Company, Salem, Illinois; Port Wing Telephone Company, Port Wing, Wisconsin; Leigh Independent Telephone Company, Leigh, Nebraska.

The F. Bissell Company, Toledo, Ohio, reports large sales of iron and steel telephone wire. The company claims that this wire is of such a quality that it will hold up under twice the torsion test. The galvanizing is perfect and the coils are solidly wound. With its immense stocks at Toledo the company is enabled to make shipments the same day the order is received. The company is sending out bulletin No. 31 on tap screws, solder, insulating material, carbon brushes, etc., which will be sent on request to any user of electrical goods. The demand for the Marlin cable hangers manufactured by this concern, is so great that it finds difficulty in keeping up with its orders, though working an extra force of men. The Bissell Company's "Handbook of Switchboards," No. 117 ("Quotations on the Spot"), is being distributed and contains much of interest on this subject. It deals with switchboards of 2,500 amperes or less, complete or in parts, and gives prices on same. All in all these are busy times at the Bissell factory. Correspondence is invited and will receive prompt attention.

The International Telephone Manufacturing Company, Chicago, reports a constantly increasing demand for its product. Among recent installations of central office equipment, consisting of their well-known type of mechanical self-storing drop switchboards, might be mentioned a 1,000 line, 600 equipped board for Parsons, Kansas, complete with protective devices, and a similar equipment at Harlan, Iowa. Also central office equipments ranging in capacity from 100 to 400 lines at Cincinnati, Iowa; Gratiot and Fort Atkinson, Wisconsin; Lena, Winslow and Preemption, Illinois; Daleville, Summitville, Medford, Frankton, Selma, Larwill, Cromwell, Hamlet, Nappanee and Arcadia, Indiana; and a 200 capacity, fully equipped addition to the board already installed at Crawfordsville, Indiana, together with a complete flashlight transfer system; also a private branch exchange board for Anderson, Indiana. Many of the foregoing orders include complete telephone equipment, consisting of the International four-party line selective instruments and their regular types of series exchange and bridging telephones. The Portage Telephone Company of Portage, Wisconsin, is installing an International, 600 line lamp signal, central energy switchboard complete with power plant and protective devices.

The Holtzer-Cabot Electric Company, Boston, has issued Bulletin No. 149, which is of more than ordinary value and interest. It opens with a general discussion on the wiring and installation of interior telephones. Three systems are considered, viz., intercommunicating, speaking tube and central switchboard, each illustrated with wiring diagrams of exceptional clearness. There are nineteen of these diagrams, and they will be of much value to those interested in and installing Holtzer-Cabot apparatus. The concluding pages give very clear directions for the installation of the apparatus. The Holtzer-Cabot Company evidently appreciates the fact that a clear illustration conveys more information to the mind than pages of cold type, and has made the best of this knowledge in this instance. This bulletin will be well worth careful preservation, and a copy of it should be in the hands of all practical telephonists. Bulletin No. 152 contains an illustrated description of the Holtzer magneto clocks for recording watchmen's signals. These clocks are made to record signals from any number of stations up to 25, and, when desired, are provided with two or three recording dials. Bulletin No. 206 describes a sensitive relay, which is operated by magneto current and arranged to close another circuit when so operated. The main circuit remains closed until the apparatus is reset.

CREOSOTED TIMBER.

The United States government has been making a study of wood preservation and after thoroughly investigating the different methods it states that the dead oil of coal tar process is the best and has proven to last the longest. It is interesting to note in this connection that the dead oil of coal tar

process has been for a long time extensively applied by the Wyckoff Pipe and Creosoting Company, Incorporated, whose offices are at Stamford, Conn., and works at Portsmouth, Virginia. This company has been creosoting timber since 1881 and, as many of its installations have been in successful use for twenty years, it has had every opportunity to study and apply the best methods for each kind of timber as used for railroad ties, wharf and bridge timbers, conduits for underground wires and cables, poles, cross-arms, piles, paving blocks, fence posts, etc. Railroad ties treated by this process will wear out, but will never rot out.

The method applied by this company in preserving wood is to first subject the timber to live steam to draw out the sap, after which creosote oil (dead oil of coal tar) is forced into the wood under high pressure. This method has proven so satisfactory that the company is willing to guarantee that its creosoted timber will never rot. It should be noted that, as creosoted timber is an excellent insulator, it is doubly valuable on third-rail systems and other electrical installations. Only recently several carloads of creosoted lumber were shipped by this company for insulating third rails in mines.

Some time ago the company received a number of pieces of conduit from one of the telephone companies in Philadelphia, with the statement that it was obliged to take up some of the Wyckoff conduit, laid fifteen years ago, on account of the subway now being built by the Philadelphia Rapid Transit Company. The telephone company wrote that every piece was found to be in a perfect state of preservation, and that even the small tenons were as sound as the day they were laid.

The United States Agricultural Department has asked for a piece of this conduit, to be put on exhibition in Washington, and also has made a request for two pieces to be sent to St. Louis.

NEW MANAGER FOR FRANK B. COOK.

Frank W. Pardee, who for some time past has been prominently identified in placing on the market the product of the Chicago Writing Machine Company, has resigned his position with that concern and accepted the post of general manager with Frank B. Cook. Mr. Pardee has won for himself an enviable reputation in the Independent manufacturing field and Mr. Cook may consider himself fortunate, indeed, in securing the services of such an experienced and valuable man to look after his manufacturing interests.

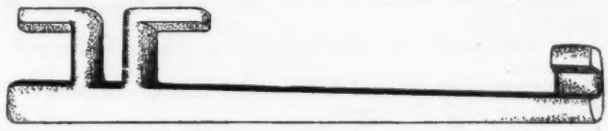
FRANK W. PARDEE.

In 1896, after finishing a four years' electrical course, Mr. Pardee took a course in advertising, at the completion of which he became advertising manager for a western magazine, remaining in that capacity two years and meeting with marked success in his work. He then became interested in the Chicago Telephone Holder, manufactured by the Chicago Writing Machine Company, and started with this firm by pushing the sale of that article and bringing it at once into prominence, with the result that the company was flooded with orders for the holder.

When the Adjustaphone was brought out it was turned over to Mr. Pardee to exploit with the public. He traveled extensively and orders for the Adjustaphone poured in at such a rate that the company had hard work to fill them. At the factory where they were made he gained considerable knowledge of the manufacturing end of the business, and the application of this knowledge made him still more valuable to the Chicago Writing Machine Company, with which firm he remained until June 1 when he entered on his new duties with Frank B. Cook, manufacturer of telephone accessories, chief among which is the celebrated Cook protectors.

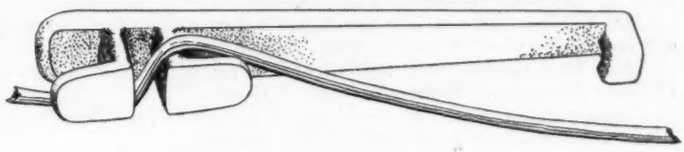
THE "PENN" WIRE TIGHTENER.

The B. R. Electric and Telephone Manufacturing Company, Kansas City, Mo., is sending out a mailing cir-



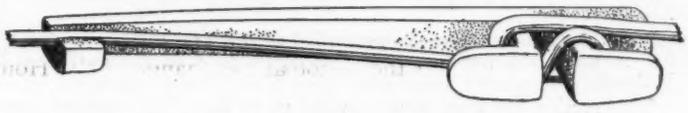
THE DEVICE.

cular descriptive of the Penn Wire Tightener, which it manufactures. It says of the device: "Ten inches of slack



THE BEGINNING.

taken up in two minutes; cost three cents. Three inches of slack between poles makes a 'sloppy' looking line and cuts down your service. Leave the tightener on the wire. Does



THE FINISH.

not crack the galvanizing. Does not injure copper. If you want to take down the line remove the device and wire will straighten out." The accompanying illustrations show the tightener in its several stages of operation.

TELEPHONE THEORIES.

Henry C. Strong, a familiar character in the telephone field, is quoted as saying: "Among the many theories advanced in regard to the present method of telephoning, none has as yet been given to the public that clearly shows how the thing is done. We hear, as well as we are able to hear, with the telephones in use, but why has the discovery not been made how to increase the volume of sound of spoken words in the telephone receiver? This is all that remains to be done to set at rest all the vague theories and ideas in telephone patents issued on false principles of acoustics. The worthy inventor should not hesitate to produce an instrument whereby the human voice may be rendered as distinct as telegraph signals in commercial use. The telephonic relay principle will do it, and it is only a question of time when the system will be put in operation throughout the world. 'They who have ears to hear, let them hear.'"

In the article in the May TELEPHONY relating to the recent legal victory of the North Electric Company over the Western Electric Company, mention was made of the fact that the case was conducted by Attorney Albert Lynn Lawrence for the North Electric Company. Mr. Lawrence also made the argument for the North company, which had not a little to do with bringing about a favorable decision from the court.

The British government telephone lines cost something like $2,000,000 more than they brought in last year.

IN THE RURAL LINE DISTRICTS

Marine Prairie wants hello to St. Cloud.—*St. Paul (Minn.) News.*

Fairmount wants the telephone poles painted.—*Bismarck (N. D.) Tribune.*

The telephones in this vicinity are on a strike.—*Bostwick Letter in Painesville (O.) Telegraph.*

The new telephone is completed and everybody is busy talking. —*Mohican Mites in Ashland (O.) Press.*

Kensal is to have a telephone system when the poles get there. —*Norwich Notes in Carthage (Mo.) Press.*

Henry Hess had a telephone put in his house one day last week.—*Cope Crumbs in Franklin (Ind.) Democrat.*

Mr. Kabrud had put into his house a first class telephone one day last week.—*Lake Crystal (Minn.) Union.*

Mrs. Ehricke has had the telephone placed in her home.—*Pohocco Pickings in Fremont (Neb.) Tribune.*

Claude Chapman was at work on our telephone line Tuesday.—*Platte Bottom Items in Ashland (Neb.) Gazette.*

The telephone men are putting up in our town this week.—*Montserrat Musings in Warrensburg (Mo.) Star.*

Curtisville people have agreed that talk is cheap since two telephone companies are completing lines to that place.—*Elwood (Ind.) Leader.*

John Brown is building a branch telephone line from Paynesville line to his home.—*Crow River Kernels in Litchfield (Minn.) Ledger.*

The telephone company has installed an office in the hotel. Nothing is too good for us.—*Dell Correspondence in Dillon (Mont.) Tribune.*

This section has been slow to wake up to the advantages of farm telephones, but they have "arrived" at last.—*Adrian (Minn.) Guardian.*

Some of the farmers are digging post holes for the new telephone company.—*South Platte Sayings in Grand Island (Neb.) Independent.*

The telephone poles are now being set and in a short time we can say "hello" to our neighbors.—*Bartley Brevities in McCook (Neb.) Tribune.*

Joseph Schwartzbach has placed a 'phone in his residence, and when you want some fresh garden sass, call up No. 50.—*Elkton (S. D.) Record.*

The telephone line is being extended north and south through Wiggletown. "The line's busy" just now.—*Wiggletown Wiggles in Ashland (O.) Press.*

Ever since the Howard County Telephone Company was organized there has been more or less friction between the members of said company. The cause of all the trouble was the alleged inability of General Manager Frandsen to climb a telephone pole. Bright and early Monday morning Brother Frandsen came down town wearing a very determined look under his big straw hat. At about 9:30 they erected the first pole and Pete was ready, all booted and spurred, to prove to his associate telephone workers that he could and would climb a pole. Well, without a slip or a falter he made the ascent, crowed a couple of times and slid down. All is harmony now among the members of the telephone company.—*St. Paul (Neb.) Republican.*

Lamont has 43 city telephones and eight rural lines. Lamont is getting to a stage of growth when she can "talk back" to most anyone.—*Wichita (Kan.) Eagle.*

The switchboard was put in at Faulkner last week and the way neighbors visit on the 'phone shows how proud they are of it.—*Faulkner Facts in Cheiopa (Kan.) Clipper.*

Our telephone line has been kept pretty hot part of the time the past week, but have heard of no damage being done to the line.—*Sherman Notes in Brookings (S. D.) Press.*

A new telephone has been placed in the mayor's office, so if your neighbor's chickens bother you just telephone his honor and

he will come down on a run and drive them out of your garden.—*Afton (Ia.) Star-Enterprise.*

The telephone exchange office has been built to Hamp West's lunch room and the box will be put to work this week.—*Bellflower Breezes in Montgomery City (Mo.) Standard.*

W. T. Reed has lately been taken on the May telephone line, and will soon be able to talk to his friends over the country.—*Stringtown Prairie Siftings in Middleton (Mo.) Chips.*

F. E. Lafferty has a 'phone now and he thinks tnat all he lacks now of being ready to keep house is some good looking woman to come and stay with him.—*Marion Mites in McCook (Neb.) Tribune.*

Earl Coskey entertained the patrons of telephone line No. 193, Sunday evening, with a choice selection of records on an Edison graphophone.—*Whitewater Notes in Richmond (Ind.) Sun-Telegram.*

J. L. Coleman is the happiest man in our midst now, but the writer predicts he will be the tiredest before long. He has two farm telephones.—*Wahoo Creek Crumbs in Ashland (Neb.) Gazette.*

The farmers' telephone line is finished and from rumors of what passes along the line the country sound so beautifully pictured in Gray's elegy are nothing compared to it.—*Georgetown Letter in Platteville (Wis.) Witness.*

Register Billy Hay is thinking of having a telephone put in his hen house in case that spring lock should play a trick on him again. He could then summon help without alarming the neighborhood.—*Fairmont (Minn.) Sentinel.*

The Kaeding and Rost farms are now connected with the Armstrong telephone line. As both families are of a very talkative disposition, the telephones along the line will ring more than ever before.—*Fairmount (Minn.) Sentinel.*

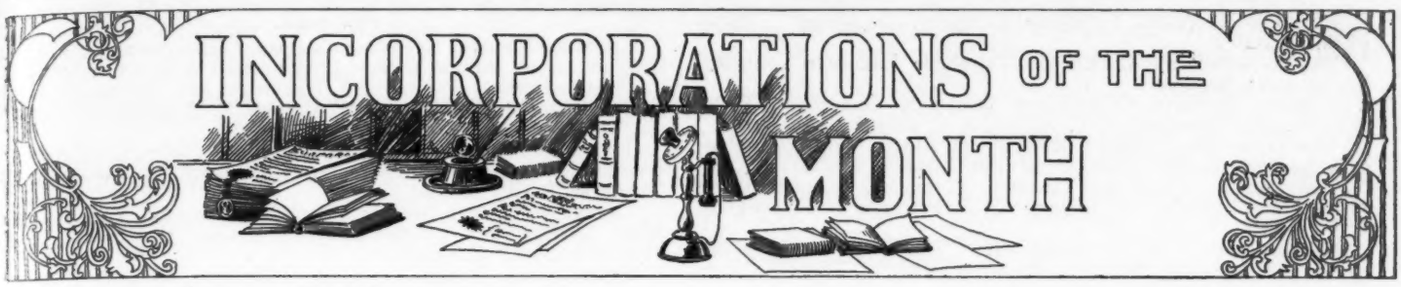
The new telephone line that is to run from Sank Hendricson's to his father's, about three and a half miles, has been named the Spokane and has twelve members.—*Rural Route No. 1 Correspondence in Cedar Rapids (Ia.) Gazette.*

Our telephone has been on a strike for several days and refused to work. Mr. Carl Hale has at last come to an understanding with said telephone and now she is doing the talking business in the good old way.—*Auxvasse (Mo.) Review.*

Jim Lewis and John Pendergrass are at work on their telephone line running south from this place south to Mt. Vernon. The telephone spirit seems to have taken hold on everybody.—*Stinson Splinters in Mt. Vernon (Mo.) Chieftain.*

This place is now connected with Shedd and Brownsville by telephone, and there are also a number of 'phones in the country connected with this system, so it can be said that Halsey is "moving right along."—*Halsey Correspondence in Albany (Ore.) Herald.*

A telephone meeting was held Monday night at the Shiloh schoolhouse. Four new members were taken on and soon it will be a good sized "pony." So the boasting line below will have its hands full to flag the pony line. —*R. F. D. No. 36 Notes in Warrensburg (Mo.) Star.*



ARIZONA.

PHOENIX—Phoenix Independent Telephone Company. Capital stock, $100,000. Incorporators, J. H. Kibbey, A. J. Edwards, H. M. Joy.

ARKANSAS.

FAIRHOPE—Eastern Shore Telephone Company. Capital stock, $3,000. Incorporators, C. L. Mershon, J. Stapleton, S. S. White.

GILLETT—People's Union Telephone Company. Capital stock, $25,000. President, Wm. J. Stilwell; vice-president, J. H. Martin; secretary, M. C. Hollis; treasurer, G. F. Mattmiller.

SANTA ROSA—The Mark West Creek and Santa Rosa Telephone Company. Capital stock, $15,000. Directors, R. W. Peterson, H. L. Hall, J. M. Laughlin, C. V. Talmadge, S. W. Purrington.

JONESBORO—Automatic Home Telephone Company. Capital stock, $25,000. President, R. L. Collins; vice-president, F. C. Watts; secretary, A. C. Gambill; treasurer, R. L. Jones; directors, S. A. Daniels, H. E. Schnee.

CALIFORNIA.

RED BLUFF—Red Bluff and Paskenta Telephone Company. Capital stock, $5,000. Directors, Albert Gallatin, Jr.; R. O. Snelling, E. D. Gardner, Dr. Owen, Charles Hesse.

IDAHO.

GRANGEVILLE—Grangeville and Salmon River Telephone Company, Ltd. Capital stock, $12,000. President, Joseph O. Levander; vice-president, E. L. Hollingshead; secretary, Rudolph Bertch; treasurer, Martin Wagner; director, Ray Gordon.

ILLINOIS.

SHELBYVILLE—The Duvall Telephone Company. Capital stock, $420. Incorporators, J. L. Hawk, C. E. Kreig, M. D. Piez.

REDDICK—The Reddick Mutual Telephone Company. Capital stock $5,000. Directors, James Reilly, I. G. McLane and others.

JOHNSTON CITY—Johnston City Telephone Company. Capital stock, $8,000. Incorporators, C. E. McClintock, W. A. Roberts, J. E. Carr.

TEMPLE HILL—Egyptian Mutual Telephone Company. Capital stock, $2,500. Incorporators, William G. Holmes, H. M. Stokes and John Mann.

SMITHFIELD—Great Western Telephone Company organized. President, W. C. Gullett; secretary, Milton T. Howeter; treasurer, Bert Chambers.

FLORA—Flora and Bringhurst Co-operative Telephone Company. Capital stock, $12,000. Incorporators, Harvey Thomas, William F. Wagoner, Spurgeon Tidrick.

UPPER ALTON—Petersburg and Upper Alton Main Line Telephone and Telegraph Company. Capital stock, $2,500. Incorporators, John S. Culp, Albert A. Penning, W. M. Cartwright.

GOLDEN—German Telephone Company. Capital stock, $5,000. Incorporators, Andrew Bartell, D. G. Buss, William Casseus. Directors, Andrew Bartell, D. G. Gronewald, John Gerjets, D. G. Buss, Menne Aden, Fred Franzen, Diedrich Fuhrken.

INDIANA.

SCIRCLEVILLE—The Scircleville Telephone Company. Capital stock, $6,000. Incorporators, C. K. Lewis, Nathaniel Cripe, William H. Cast, Alfred Weaver and others.

URBANA—Urbana Independent Telephone Company. Capital stock, $10,000. Directors, Emanuel Staver, Adam Cook, George Pretorious, E. F. Baker, J. C. Schmalzried.

VEVAY—Farmers' Mutual Telephone Company. Capital stock, $5,000. Directors, J. D. Froman, G. B. Hall, H. Weals, J. L. Muret, A. Y. Danner, Robert Hatton, William Waltz.

BLUFFTON—Mt. Cory Farmers' Mutual Telephone Company, organized. President, W. A. Williamson; vice-president, S. F. Whisler; secretary, Milton Steininger; treasurer, Robin Bowersox; trustees, Oliver Flick, C. F. King, L. A. Bubler.

INDIAN TERRITORY.

GOODWATER—Goodwater Telephone Company. Capital stock, $200. President, W. J. Whitmore; vice-president, B. S. Harris; secretary-treasurer, W. H. McBrayer.

IOWA.

ADAIR—Grant and Audubon Township Telephone Company organized.

CASEY—The Casey Mutual Telephone Company. Capital stock, $1,500. Incorporators, A. M. Fagan and others.

POSTVILLE—Postville and Frankville Telephone Company. Capital stock, $3,000. Incorporators, F. W. Meyer and others.

DEFIANCE—Defiance Telephone and Electric Light Company. Capital stock, $15,000 Incorporators, Frank McGuire and others.

BENTONSPORT—Farmers' Connective Telephone Company of Van Buren County. Capital stock, $10,000. Incorporators, J. W. Batchelor, president, and others.

WELDON—Smyrna & Weldon Telephone Company. Capital stock, $250. Incorporators, W. N. Hall, T. B. Jamison, George A. Beattie, Arthur Hoover, John Cannon.

KANSAS.

ST. JOHN—Albany Telephone Company. Capital stock, $840.

DELPHOS—Rural Telephone Association. Capital stock, $3,000.

BARNARD—Barnard Telephone Company. Capital stock, $5,000.

LENEXA—Interstate Telephone Company. Capital stock, $7,500.

SPEARVILLE—Spearville Telephone Company. Capital stock, $2,000.

HOXIE—Sheridan County Telephone Company. Capital stock, $2,000.

MAHASKA—The Mahaska Telephone Company. Capital stock, $3,500.

BOW CREEK—The Bow Creek Telephone Association. Capital stock, $2,000.

CHAPMAN—Chapman Mutual Telephone Company. Capital stock, $5,000.

CONCORDIA—The Farmers' Central Telephone Company. Capital stock, $10,000.

EUREKA—Greenwood County Telephone Company. Capital stock, $33,000.

KENTUCKY.

EVANSVILLE—The Anti-monopoly Telephone Company, organized. Capital stock, $500,000.

MAYKING—Mayking Telephone Company. Capital stock, $3,000. Incorporators, B. Webb and others.

MADISONVILLE—Rural Telephone Company of Hopkins County. Incorporators, W. N. and W. B. Bradley and M. F. Allen.

SEELEYVILLE—Lost Creek Mutual Telephone Company. Capital stock, $3,500. Directors, F. H. Felling, F. C. Conway, M. A. Modesitt.

BRANDENBURG—Brandenburg and Big Bend Telephone Company. Capital stock, $2,500. Incorporators, S. B. Crecelius, Wm. Green, M. J. Bennett.

SCOTTSVILLE—Allen County Home Telephone Company. Capital stock, $2,500. President, J. W. Huntsman; vice-president, R. Huntsman; secretary, S. J. Read; treasurer, A. S. Gardner.

MAINE.

CAMBRIDGE—The Cambridge Telephone Company. Capital stock, $10,000. President, F. J. Hersey, Cambridge; treasurer, D. F. Clark, Cambridge.

AUGUSTA—Zenith Telephone Company. Capital stock, $1,000,000. President, M. H. Simmons, Augusta; treasurer, E. F. Whittum, Augusta; directors, C. L. Andrews, Augusta; W. M. Hubbard, E. L. Headley and Wm. Harrison, Duluth, Minn.

MICHIGAN.

STAMPER'S CREEK—Stamper's Creek and Orleans Telephone Company. Capital stock, $200. Directors, Harry McCoy, Shelby Cornell, Benjamin F. Williams.

MINNESOTA.

FAIRFAX—Renville Rural Telephone Company, organized.

CLARKFIELD—The Clarkfield Telephone Company organized.

TRAVERSE—Farmers' Co-operative Telephone Company. Capital stock, $12,000.

CARVER—Farmers' Co-operative Telephone Company. Capital stock, $12,000.

BELGRADE—Belgrade Telephone Company, organized. Capital stock, $12,000.

DASSEL—The Dassel-Collinwood Telephone Exchange Company. Capital stock, $25,000.

WINONA—Farmers' Co-operative Telephone Company. Capital stock $12,000. Directors, C. L. Nelson, F. E. Briggs.

WELLSTON—The Wellston Mineral and Athens Telephone Company has increased its capital stock from $2,000 to $10,000.

WATERTOWN—Watertown Telephone Company. Capital stock, $25,000. Incorporators, F. A. Barth, G. F. Peterson, G. E. Halgren, R. J. Burke.

CANTON—The Canton Co-operative Telephone Company has elected the following officers: President, Thomas Thorson; vice-Capital stock $3,000

HECTOR—Hector, Logan and Burdett Telephone Company. Capital stock, $5,000. Directors, C. D. Smead, H. F. Logan, W. B. Hueston, J. D. Mallory.

BAINBRIDGE—Bainbridge Telephone Company. Capital stock, $40,000. Incorporators, William Howard, C. R. Post, A. B. Chamberlain, G. A. McFarland, O. J. Post.

SHAKOPEE—Merchants' and Farmers' Telephone Company of Shakopee. Capital stock, $10,000. Directors, H. W. Reiter, M. V. Johnson, C. T. Buchanan, John P. Ring, H. P. Marx, Henry M. Reis and Henry C. Schroeder; president, H. P. Marx; vice-president, C. T. Buchanan; secretary, H. W. Reiter; treasurer, Henry M. Reis.

MISSISSIPPI.

HOPKINS—Rural Telephone Company. Capital stock $5,000. Stockholders, W. N. Bailey and others.

MISSOURI.

BRIDGMAN—Home telephone company organized.

MENDOTA—Chanter Telephone Company organized. Capital stock, $1,200. Directors, D. D. Simmons, A. F. Williams, F. M. Tull.

ELKTON—The Cecil Farmers' Telephone Company organized. President, E. Balderson; vice-president, Alf McVey; secretary, Cecil E. Ewing.

EOLIA—Eolia and Hobart Telephone Company, organized. President, J. M. Hail; vice-president, Herman Jenson; treasurer and secretary, J. O. Huckstep.

WILLIAMSVILLE—Williamsville and Sherman Telephone Company. Capital stock, $2,500. Incorporators, Chas. M. Woods, Nathan Jussey, S. T. Jones.

MONTANA.

BILLINGS—Montana Telephone Construction Company. Capital stock $10,000. Incorporators, H. W. Rowley, M. A. Arnold.

BILLINGS—Billings Mutual Telephone Company. Capital stock $40,000. Incorporators, L. L. Moffett, M. A. Arnold, P. B. Moss.

NEBRASKA.

NELSON—Nuckolls County Independent Telephone Company. Capital stock, $25,000.

ODELL—Odell Independent Telephone Company. Capital stock, $10,000. Incorporators, James Colgrove, T. W. Stanoshek, John E. Murphy, J. B. Renard, Frank J. Truxaw, Arthur Williamson.

WAYNE—Wayne Independent Telephone Company. Capital stock. $15,000 President, Thomas H. Fritz; vice-president, Irving E. Huff; secretary, Frank E. Bell; treasurer, Andrew N. Matheny.

AINSWORTH—The Keyapaha and Brown Telephone Company has elected the following officers for the ensuing years: President, William Stonicker; vice-president, William Davison; treasurer, F. A. Baldwin; secretary, W. H. Williams.

NEW HAMPSHIRE.

CLAREMONT—Independent Telephone Company. Capital stock, $100,000.

FAIRFIELD—The Fairfield Telephone Company, organized. President, C. H. Epperson; secretary, M. L. Jones; treasurer, Dr. G. M. Prentice; directors, J. M. Lovell, J. T. Weyenburg, and S. C. Thompson.

HEALDSBURG—West Side Telephone Company of Healdsburg. Capital stock, $6,000. President, John McClish; vice-president, M. V. Frost; secretary and treasurer, S. L. Wattles; directors, J. L. McClinsh, J. B. Wattles, D. N. Goddard, A. D. Goddard.

NEW MEXICO.

BELL—Mesa Telephone Company. Capital stock, $5,000. Incorporators and directors, John Utton, Patrick H. Simmons, Thomas E. English, Samuel J. Murray of Bell, Edgar W. Fulgham, Thomas B. Lyon and Thomas Thatcher of Raton.

OXFORD—Oxford Valley Telephone Company. Capital stock, $1,000. Directors, Ward B. Gifford, George B. Fletcher, John J. Lillis, Willard E. Cronk, Frank E. Headle, Albert B. Haight, Richard Tillotson, Clark L. Webb and Milton L. Whitney, all of Oxford.

NEW YORK.

CHESTER—Chester Telephone Company. Incorporators, Fred L. Conklin, Joseph Durand & Son; Fred Vollmer & Son, Chester, N. Y.

HAMMONDSPORT—Wayne and Hammondsport Telephone Company. Capital stock, $2,000. Incorporators, L. Wortman, W. Anderson, D. A. Webster.

POTSDAM—Northern Union Telephone and Telegraph Company. Capital stock, $50,000. Incorporators, William M. Booth, A. B. Thomson, R. W. Seinner.

GREENE—Chenango-Broome Telephone Company. Capital stock, $700. Incorporators, Charles C. Allen, Greene; E. Watrous, A. L. McIntosh, North Colesville.

SUMMITVILLE—Boone Township Telephone Company. Capital stock, $1,000. Directors, William Sullivan, Robert E. Ball, Joseph A. Keaton, Scott W. Thurston.

COOPER'S PLAINS—Cooper's Plains Telephone Company, organized. President, Frank F. Pierce; vice-president, J. C. Bryson; secretary and treasurer, Dr. B. Pierce.

WOLCOTT—Farmers' Co-operative Telephone Company. Capital stock, $500. Incorporators, Robert Brundridge, Wolcott; Benjamin Brundridge, Sylvert Brundridge, Wolcott, N. Y.

FORESTVILLE—Conewango Valley Home Telephone Company. Capital stock, $11,000. Incorporators, A. H. Libby, Forrestville; E. B. Crissey, Jamestown; B. C. Wilson, South Dayton.

SOUTH BETHLEHEM—South Bethlehem Telephone Company. Capital stock, $2,000. Directors, E. C. Palmer, Charles D. Niver, J. R. Davidson, Newton B. Vanderlee, John W. Mosher, John B. Mosher, John F. Vrooman.

NORTH CAROLINA.

CLINTON—Sampson Telephone Company organized. Secretary and treasurer, R. M. Royal, Owensboro.

OHIO.

NEW CASTLE—Garfield Telephone Company. Capital stock, $50,000.

MORRAL—Morral Telephone Company. Capital stock, $10,000. Incorporators, J. A. Baer and others.

WALDO—Waldo Bell Telephone Company. Capital stock, $5,000. Incorporators, William Gabler and others.

GRATIOT—Gratiot and Brownsville Telephone Company. Capital stock, $5,000. Incorporators, George D. Orr and others.

TROY—Standard Telephone and Telegraph Company. Capital stock, $25,000. Incorporators, Charles Henderson, W. C. Cameron.

OTTAWA—Ottawa Mutual Telephone Company. Capital stock, $1,000. Incorporators, C. O. Beardsley, J. H. Purnell, F. E. Smith, E. L. Tupper, George Fritz.

GILBERT—Gilbert Telephone Company. Capital stock, $20,000. Incorporators, E. L. Roe, C. Manefee, H. L. Nye, J. B. Rhoades, W. M. Bateman, S. M. Winn.

ORWELL—People's Co-operative Telephone Company organized. President, E. D. Chaffee; vice-president, J. C. Petts; secretary, H. G. Newell; treasurer, E. B. Arnold.

GREENVILLE—Eldorado and West Manchester Telephone Company. Capital stock, $40,000. Incorporators, C. R. Leftwich, Conrad Ripp, F. S. Conkling, J. U. Ries, W. D. Rush.

ELDORADO—The Eldorado and West Manchester Telephone Company. Capital stock $40,000. Incorporators, Conrad Ripp, F. S. Conkling, J. A. Reis, W. D. Rush, C. R. Lefturich.

PLEASANT CITY—Pleasant City Telephone Company. Capital stock, $1,000. Incorporators, C. L. Stranathan, William Miley, J. H. Danford, Harmon Miley, Florence Danford, Edna Stranathan.

HONESDALE—Honesdale Telephone Company. Capital stock, $40,000. Treasurer, Albert F. Moat, Scranton; directors, Wm. C. Harding, Edw. W. Prish, W. R. Prior, Jr., Albert F. Moat, Frank Brenton.

OKLAHOMA.

INDEPENDECE—Deer Creek Telephone Company. Capital stock, $50,000. Incorporators, C. M. Collins, Seven Oaks; W. R. Cooper, T. W. Grigsby, Chas. Peterson and T. M. Nelson, Independence.

OREGON.

DURKEE—Express Telephone and Telegraph Company. Capital stock, $1,500. Incorporators, W. G. Ayre, F. S. Bubb, F. L. Moore.

DAYTON—Yamhill County Mutual Telephone Company. Capital stock, $3,000. Incorporators, R. N. Snell, F. L. Post, John Versleen, J. W. Martin, J. E. Mellinger.

PENNSYLVANIA.

PIKE'S CREEK—The Lake and Lehman Telephone Company. Capital stock, $5,000. Treasurer, Milton L. Ruggles; directors, J. C. Van Loon, W. R. Neeley, Arthur Major, Wm. Armstrong, E. M. Allen, M. L. Ruggles, D. W. Bronson, Pike's Creek.

TENNESSEE.

GREYSTONE—Greystone Telephone Company. Capital stock, $500.

Incorporators, Hardie Johnson, Wiley McCoy, Sparling Bowman, George McCoy, Dan McCoy and C. W. Allen.

TEXAS.

BEN WHEELER—Central Telephone Company. Capital stock $5,000. Incorporators, W. J. Steward, A. J. Adboni, J. A. Reynolds.

SCHULENBURG—Schulenburg Telephone Company. Capital stock, $5,000. Incorporators, W. E. Perlitz, C. A. Perlitz, John Schumacher.

BAY CITY—Bay City and Matagorda Telephone Company. Capital stock, $5,000. Incorporators, W. W. Bouldwin, R. H. Taylor, A. W. McNabb.

BROWNSVILLE—Brownsville Telephone Company. Capital stock, $10,000. Incorporators, James B. Wells, Baldwin G. Stayman and Frank W. Kibbe, Brownsville.

WAXAHACHIE—Mutual Telephone Company. Capital stock, $50,000. Incorporators, John M. Harrison, Waxahachie; P. M. Wheatley, W. A. Lewis, Howard; W. A. Culbertson, Sterrett; J. B. Wiley, Ovilla.

VERMONT.

BLAND—Bland Telephone Company. Capital stock, $5,000.

SOUTH DAKOTA.

FARMER—Edgerton Township Telephone Company. Capital stock, $3,000.

VIRGINIA.

STUART—Patrick County Telephone Company. Capital stock, $5,000. President, T. L. Clark.

WEST VIRGINIA.

CHARLESTON—Imperial Construction Company. President, Homer P. Dixon; vice-president, James E. Ferguson; secretary, E. P. Lawler.

JANELEW—People's United States Telephone Company. Capital stock, $50,000. Incorporators, A. B. Post, C. L. Cockman, N. A. McWhorton and others.

WISCONSIN.

PRAIRIE DU CHIEN—Star Telephone Company. Capital stock, $14,000. Incorporators, M. Menges, J. A. Haggerty and Lawrence Case.

BONAPARTE—Farmers' Connective Telephone Company. Capital stock, $10,000. President, J. W. Batchelor; secretary, D. R. Hornbaker.

ORILLIA—The Orillia Telephone Company. Capital stock, $600. Incorporators, George Allis, P. M. Turner, John McClain, A. M. Willis, James Graham, W. W. Miller.

GREEN BAY—Johnson-Schiller Telephone Company. Capital stock, $20,000. Incorporators, J. S. Johnson, L. G. Schiller, Lawrence H. Cady, Sam A. Bell, L. E. Reiner.

WASHINGTON.

MONROE—Tualco Telephone Company. Capital stock, $1,000. Incorporators, F. E. Ferguson, T. M. Bennett, F. E. Phelps.

ANNUAL MEETINGS.

ARKANSAS.

BUCKNER—The Jackson County Telephone Company has elected the following officers for the ensuing year: President, Dr. N. D. Ravenscraft; vice-president, J. G. Burley; treasurer, W. W. Ewing, secretary, A. F. Frazier; directors, Dr. N. D. Ravenscraft, J. G. Burnley, Joel F. Chiles, Ed Dieckman, George Peace, Wm. Larey, W. W. Ewing.

ILLINOIS.

GUTHRIE—The Farmers' Mutual Telephone Company has elected the following officers: President, W. J. Poplett; vice-president, W. M. Cleary; secretary and treasurer, Robt. Reynolds.

IVESDALE—The directors of the local telephone company have elected the following officers: President, M. Loftus; vice-president, James Somers; secretary, A. J. Tabaka; treasurer, F. M. Watts.

CANTON—The board of directors of the Home Telephone Company has elected the following officers for the ensuing year: President, Eugene Smith; vice-president, M. J. Gorman; treasurer, T. C. Fleming; secretary and manager, F. W. Plattenburg.

LINCOLN—The Central Illinois Telephone and Telegraph Company has elected the following officers for the ensuing year: L. C. Schwerdferger, P. E. Kuhl, J. W. Collins, T. M. Harris, E. G. King. President, J. W. Collins; vice-president, T. M. Harris; secretary and treasurer, H. P. Martin.

ALTON—The local telephone company has elected the following officers: President, Dr. C. A. Moore; vice-president, John Kreig; secretary, John Cousins; treasurer, H. Rammes; manager, H. G. Bassett.

BENTON—The Tri-County Telephone Company has elected the following officers: President, J. T. Payne; Mt. Vernon; vice-president, W. B. Eaton, Paradise; secretary, C. P. Nesmith, Mt. Vernon; treasurer, J. J. Pierce, Ewing.

BROWNING—Browning Local Telephone Company. President, Dr. Rice; vice-president, J. P. Campbell; secretary, R. E. Jackson.

IPAVA—Ipava and Lacey Telephone Company. President, R. W. Davis; vice-president, J. Graham; secretary and treasurer, C. M. Lindsey.

FULTON—The Fulton Telephone Company has elected the following officers: President, George Reutschler; secretary and superintendent, H. L. Becker; treasurer, E. E. Jackson.

GUTHRIE—The Farmers' Mutual Telephone Company has elected the following officers: President, W. J. Poplett; vice-president, W. M. Cleary; secretary and treasurer, Robert Reynolds.

PITTSFIELD—The stockholders of the Pike County Telephone Company have elected the following officers for the ensuing year: President, R. T. Hicks; secretary and manager, Ed D. Glandon; auditor and treasurer, L. A. Chamberlain.

ASSUMPTION—The stockholders of the Assumption Mutual Telephone Company have elected the following directors for the ensuing year: R. F. Johnson, Leo. Johnson, A. L. Moore, E. W. Hight, Allan Peabody, J. A Lamdin, Richard Osborn; president, R. F. Johnson; secretary and treasurer, E. W. Hight.

SANDWICH—The Northern Illinois Telephone Company has elected the following officers for the ensuing year: President, F. S. Mosher; vice-president, J. N. Antoine; treasurer, C. F. Sedgwick; secretary and general manager, E. C. Hennis; directors, E. A. Manchester, M. D. Patten, Justin Latham, L. I. Taylor, G. H. Hicks, Wm. Van Ohlen.

INDIANA.

ANTIOCH—The Hampton Ridge Telephone Lines have elected the following officers: President, Abijah North; vice-president, Wm. Orr; secretary and treasurer, Fred Gricoe; directors, James Mead, Kelsey Baldwinc, J. L. Jack.

BLOOMFIELD—The Home Telephone Company has elected the following officers: President, J. Moss; vice-president, Cyrus E. Davis; secretary, Otto F. Herold.

INDIAN TERRITORY.

ARDMORE—The Chickasaw Telephone Company has elected the following officers: President, H. C. Potterf; vice-president, Erwin Dyer; secretary and treasurer, W. S. Wolverton; manager, W. H. Berry.

IOWA.

OTTUMWA—The Ottumwa Telephone Company has elected the following officers: President, Frank S. Turner; vice-president, H. W. Stech; secretary-treasurer, L. J. Estey.

CEDAR FALLS—The Cedar Falls Mutual Telephone Company has elected the following directors: N. H. Harris, C. A. Round, L. O. Robinson, A. L. Brodie and Wilbur Hostro.

FAIRFIELD—The Jefferson County Telephone Company has elected the following officers for the ensuing year: President, J. C. Thorne; vice-president, Ed Thorne; secretary, E. F. Simmons; treasurer, Frank Light.

IOWA CENTER—The Iowa Center Telephone Company has elected the following officers: President, F. J. Bardwell; vice-president, Charles Patterson; secretary, C. B. Mall; treasurer, Charles Tatge; directors, C. Allers, S. Wright, J. May.

TABOR—The City Telephone Company has elected the following officers for the ensuing year: President, W. I. Bell; vice-president, M. T. Davis; secretary, E. H. Harrison; treasurer, Ira McCormack; manager, W. B. Bell; directors, W. B. Bell, M. T. Davis, W. I. Bell, Ray Weatherhead, W. R. Goy, Tabor; C. H. McCready, Macedonia; Robert McKenzie, Silver City; M. W. Sells, Randolph.

MAPLETON—The Maple Valley Telephone and Telegraph Company has elected the following officers for the ensuing year: President, W. H. Leathers; vice-president, J. C. Hammond; secretary, C. H. Smith; treasurer, T. B. Lutz; Chas. G. Cockerill of Jefferson, Ia., W. H. Booher of Danbury and Chas. I. White, directors.

SCRANTON—The Independent Telephone Company of this place has elected the following officers for the ensuing year: President, E. A. Olive; vice-president, J. Osborn; treasurer, D. J. Dunning; secretary, D. C. Olive.

CISSNA PARK—Fountain Creek Telephone Company. Capital stock, $34,000. President, G. H. Wieland; manager, C. A. Erskine; secretary and treasurer, H. H. Tucker; directors, C. H. Hapwood, W. A. Yeazel, Fred Bleuer.

KANSAS.

BELOIT—The Beloit Telephone Company has elected the following officers: President, W. W. Lufkin; treasurer, W. M. Brittan; manager, Alfred Slater.

CANTON—The Lewis County Telephone Company has elected the following officers: President, F. L. Marchand; vice-president, O. C. Clay; secretary, C. M. Bradshaw; treasurer, W. B. Hinton.

KENTUCKY.

MAYSVILLE—The Mason County Telephone Company has elected the following officers for the ensuing year: President, John T. Martin; vice-president, W. E. Piles; secretary and treasurer, C. M. Bolinger.

MASSACHUSETTS.

ROWE—The Rowe Telephone Company has elected the following officers: President, A. P. Goldthwait; vice-president, P. P. Chilcott; clerk and treasurer, H. D. Wright.

MICHIGAN.

DUNDEE—The Monroe County Telephone Company has elected the following officers: President and general manager, J. W. Gradolph; secretary and treasurer, Seth C. Dixon; directors, W. B. Lofler, John J. Dixon, W. F. Gradolph.

LIVINGSTON—The Livingston Home Telephone Company has elected the following officers: President, R. B. McPherson; vice-president, L. E. Gardner; secretary, J. E. Brown; treasurer, O. J. Parker.

MINNESOTA.

WINTHROP—The People's Independent Telephone Company has elected the following officers: President, C. M. Peterson; vice-president, H. G. Witte; secretary, J. A. Larson; treasurer, C. A. Benson; directors, C. A. Schilling, E. W. Olson, S. Hagberg.

WATERTOWN—The Watertown Telephone Company has elected the following directors: O. J. Bleedorn, F. A. Barth, C. G. Johnson, Guy E. Halgren, C. F. Patterson, S. L. Anderson, A. G. W. Anderson, F. L. Williams, J. F. Campbell, R. J. Burke, Levi Johnson; president, F. A. Barth; vice-president, C. F. Petterson; secretary, G. E. Halgren; treasurer, R. J. Burke.

ST. PETER—The Nicollet County Telephone Company has elected the following officers for the ensuing year: President, M. P. Quist; vice-president, Charles Samuelson; secretary and manager, C. C. Nelson; treasurer, P. A. Retrum; directors, O. N. Johnson, Gibboa; M. P. Quist, New Sweden; P. A. Retrum, Lafayette; H. A. Burke, Norseland; Victor Larson, Winthrop; G. M. Cesander, Winthrop; C. C. Nelson, New Sweden; Charles Samuelson, Bernadotte; H. J. Essler. St. Peter

MISSOURI.

MOBERLY—The Cairo Telephone Company has elected the following officers: President, Henry McKinney; vice-president, F. Haines; secretary, John Boucher; treasurer, J. W. Stigall.

MEMPHIS—The Scotland County Mutual Telephone Company has elected the following officers for the ensuing year: President, C. M. Moore; vice-president, George Soyer; secretary, J. L. Tennant; treasurer, M. M. Meyer.

NEBRASKA.

SCRIBNER—The Farmers' Telephone Company has elected the following officers: President, John Emanuel; vice-president, Fred Howe; treasurer, A. J. Hasson; secretary, H. G. Meyer.

LITCHFIELD—The Round Grove Telephone Company has elected the following officers: President, R. R. Martin; vice-president, A. M. Rumery; secretary, C. W. Martin; treasurer, L. S. Smith; executive committee, W. H. Duncan, L. J. Smith, W. T. Shaffer.

NEW HAMPSHIRE.

SALISBURY—The Kearsarge Telephone Company has elected the following officers: president, W. M. Burbank; secretary, John W. Little; treasurer, Thomas R. Little.

NORTH DAKOTA.

HILLSBORO—The Traill County Telephone Company has elected the following officers for the ensuing year: President, A. T. Kraabel; vice-president, W. A. McCain; secretary, John Carmody; directors, John E. Paulson, W. A. McCain J. D. Burke Alex Stewart, L. H. Larson, John Carmody, A. T. Kraabel.

NEW YORK.

COOPERSTOWN—The Cooperstown, Cherry Valley and Sharon Springs Telephone Company has increased its capital stock from $5.000 to $10,000.

SCHENECTADY—The Schenectady Home Telephone Company has elected the following officers for the ensuing year: president, Chas. F. Veeder; vice-president, I. S. Griswold; secretary, S. M. Strong; treasurer, E. S. Kellogg.

WARSAW—The Wyoming County Telephone Company has elected officers as follows: President, H. A. Pierce; vice-president, N. H. Lewis; secretary, E. B. Windsor; treasurer, M. N. Cole. An exchange will be installed at Cadtile.

CLIFTON SPRINGS—The Clifton Springs Telephone Company has elected the following officers: President, W. F. Burke; vice-president, J. H. Stephens; secretary, K. L. Wright.

KELSEY—The Kelsey Telephone Company has elected the following officers: President, W. A. Allison; vice-president, W. Kingsburg; secretary, C. C. Scott; treasurer, W. H. Nichols.

MANCHESTER—The Red Jacket Telephone Company has elected the following officers for the ensuing year: President and general manager, Carlos P. Osgood; vice-president, R. B. Peck; secretary, W. C. Ellis; treasurer, O. S. Titus.

PURDY CREEK—The Purdy Creek Telephone Company has elected the following officers for the ensuing year: President, Scott B. Van Buskirk; secretary, Myron Acker; treasurer, William Donaldson; superintendent, E. C. Henry.

OHIO.

RICHARDSON—The Richardson Telephone Company has elected the following officers: President, Sam. R. Harben; secretary and treasurer, W. T. McKamey.

KYGER—The Kyger Independent Telephone Company has elected the following officers: President, C. A. Rife; secretary, W. C. Ely; treasurer, M. C. Boice.

CHESTER—The Citizens' Telephone Company has elected the following officers: President, William Stobart; vice-president, S. A. McCullough; secretary, J. S. Frank; treasurer, Wendel Cants.

MT. VERNON—The Mt. Vernon Telephone Company has elected the following directors: Rrank L. Beam, Harry C. Devin, W. P. Bogardus, P. S. Kelser, E. O. Arnold, B. D. Herron, R. G. McClelland, H. G. Beam, J. W. Kelser.

ASHTABULA—The Ashtabula Telephone Company has elected the following officers: President, P. C. Remick; vice-president, W. R. Flower; secretary, S. W. Crosby; treasurer, D. B. Seymour.

PENNSYLVANIA.

GREENTOWN—The Cresco and Greentown Telephone Company has elected the following officers: President, J. A. Seguine; vice-President, La Fayette Price; secretaries, Fred Feltham and S. B. Mikels; treasurer, S. Shively.

THOMPSON—The stockholders of the Northwestern Pennsylvania Telephone Company have elected the following directors for the ensuing year: T. E. Benson, J. W. Tiffany, C. K. Bigelow, F. J. Osgood, Thomas Spears, J. E. Curtis, H. C. Noble, D. R. Braman.

SOUTH DAKOTA.

KIMBALL—The Kimball Telephone Company has elected the following officers: President, Dr. Willet; vice-president, C. R. Tinan; secretary, A. S. Stuver; treasurer, H. W. Hinrichs; general manager, A. M. Bowles.

HARTFORD—The Union Telephone Company has elected the following officers: President, Martin McLeod; vice-president, F. E. Van Demark; treasurer, E. W. Munson; secretary and manager, D. W. Greatorex.

TEXAS.

AUSTIN—The Texas Telephone and Telegraph Company has elected the following officers for the ensuing year: President, C. C. Gibbs, San Antonio; vice-president, W. R. Hanley, Austin; superintendent, E. B. Clyde, Llano.

RICHARDSON—The Richardson Telephone Company has elected officers as follows: President, Sam P. Harben; secretary and treasurer, W. T. McKamy.

VERMONT.

MIDDLEBURY—The Addison County Telephone Company has elected the following officers: President, John A. James; vice-president and treasurer, Allen Calhoun; secretary, W. H. Davis.

The company will make several extensions.

WEST VIRGINIA.

AUGUSTA—The Augusta Telephone Company has elected the following officers: President, J. W. Churchman; first vice-president, A. M. McCue; second vice-president, M. Bruce Whitmore; secretary, J. S. Richey; treasurer, J. M. Baylor.

WISCONSIN.

BANGOR—The Bangor Telephone Company has elected the following directors: N. M. Elsen, Oscar Hussa, Ira Richardson, J. D. Vaughan, W. H. Page, E. J. Kneen, Hugo Hussa.

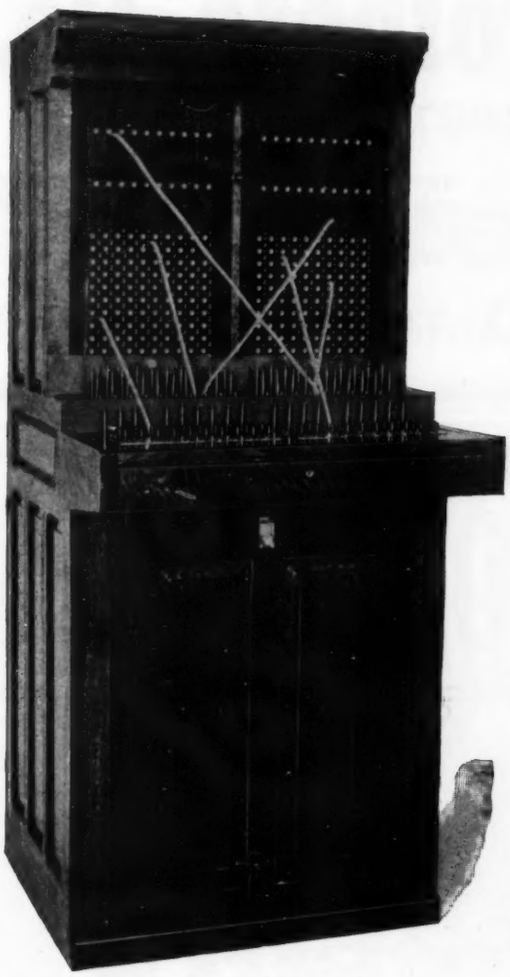
George T. Hewes, formerly with the Lincoln (Neb.) Telephone Company, has been engaged by Bills Brothers as superintendent of construction of the telephone system which is being installed by them at Sioux City, Iowa. It was through the courtesy of Mr. Hewes that TELEPHONY secured the larger part of its data for the article on the new automatic telephone system at Lincoln (published in our May issue), in the construction of which he was prominently identified. Mr. Hewes' success in the Independent field is merited, and is due to the hardest kind of work, coupled with genuine ability.

Louisiana Purchase Exposition

EXHIBIT OF WORKING SECTIONS OF

THE FALLER SEMI-AUTOMATIC TELEPHONE EXCHANGE SYSTEM

WILL BE RUNNING BY JUNE FIRST



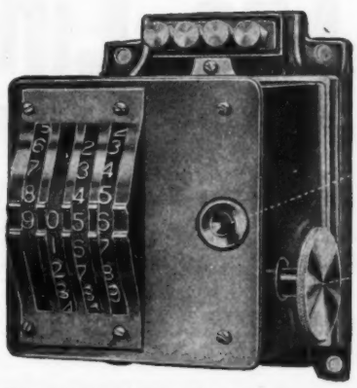
200 Line Standard Section Faller Semi-Automatic System.

and will demonstrate how this wonderful invention

Abolishes Multiples in Manual Switchboards

Enables telephone companies to give subscribers automatic service with their present manual boards.

Saves them over fifty per cent of the cost of operators.



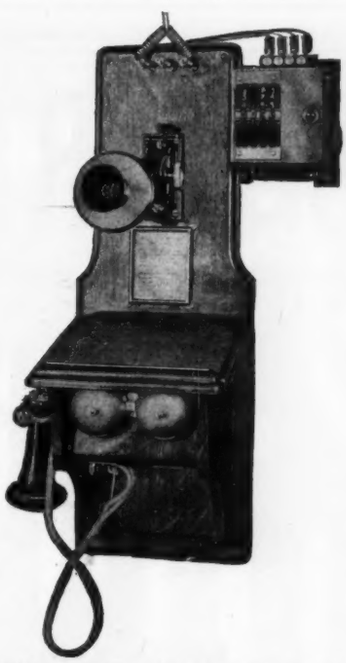
This is the Sender used by both systems.

WE WILL ALSO EXHIBIT

a little later, a working section of the

Entirely Automatic Telephone Operator

which, unlike every other automatic telephone apparatus, is not of fragile construction, but is a handsome, compact, strongly made machine, run by power, not by magnets, which does the entire work of switching automatically, in the quickest, most perfect, certain and private manner.



This is the ordinary telephone instrument with Sender placed near it.

Both systems are Central Energy, give Selective Party Line service, and make trunked calls, complete, in four and a half seconds.

The Automatic and Semi-Automatic Systems work interchangeably.

THE FALLER AUTOMATIC TELEPHONE EXCHANGE CO. OF NEW YORK.

OFFICE:
1814 Broad Exchange Building

FACTORY:
772-776 Twelfth Ave., Foot of West 55th St., New York.

WESTERN

CEDAR POLES

IDAHO WASHINGTON MONTANA

The Lindsley Brothers Co.

SPOKANE, WASHINGTON

NOTICE. Dealers advertise Western Poles who never saw one. We are located in the West, our money invested, ready at all times to give your orders our personal attention. We are producers—not scalpers—and acknowledged pioneers and original shippers of Western Cedar Poles. Write us.

GENERAL OFFICE CHICAGO TRIBUNE BUILDING

CEDAR TELEPHONE POLES

Thoroughly seasoned.

Any length or size.

Immediate shipment.

Seven distributing yards.

Forty years' experience.

Main Office, 1211-12-13 Marquette Bldg., Chicago

WM. MUELLER COMPANY

Please tell the Advertiser you saw his Announcement in TELEPHONY.

CEDAR POLES

ALL SIZES FROM 16ft. to 70ft. for PROMPT SHIPMENT

We Own Large Tracts of Cedar Timber and Produce in Our Own Camps a Large Part of the Material we Handle.

WRITE FOR A COPY OF OUR TELEGRAPH CODE FOR CEDAR PRODUCTS.

C. H. WORCESTER CO.

Suite 1206, Tribune Building, Chicago, Ill., U. S. A.

YARDS:
CHICAGO, MENOMINEE,
CHEBOYGAN,
ALPENA.

CEDAR POLES

TRADE MARK

RABER AND WATSON

OLD COLONY BLDG. CHICAGO.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

WITTENBERG CEDAR CO.

WITTENBERG, WISCONSIN

PRODUCERS AND WHOLESALERS
OF MICHIGAN AND WISCONSIN

CEDAR

POLES, POSTS AND PILING

Special Attention Given to all Inquiries and Shipments Made Promptly

WRITE US FOR OUR DELIVERED PRICES

White Cedar Poles

ALL LENGTHS AND SIZES.

We are especially anxious to sell 20 and 25 foot lengths, 4 and 5 inch tops.

HOLT LUMBER COMPANY,

OCONTO, WIS.

STOCKS AT
Oconto, Wis., C. & N.W. and C. M. & St. P.
Mountain, Wis., C. & N. W.
Pound, Wis., C. M. & St. P.
Riddle Jct., Mich., C. M. & St. P.

Chicago Office, 315 Dearborn St.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

Pittsburg & Lake Superior Iron Co.,

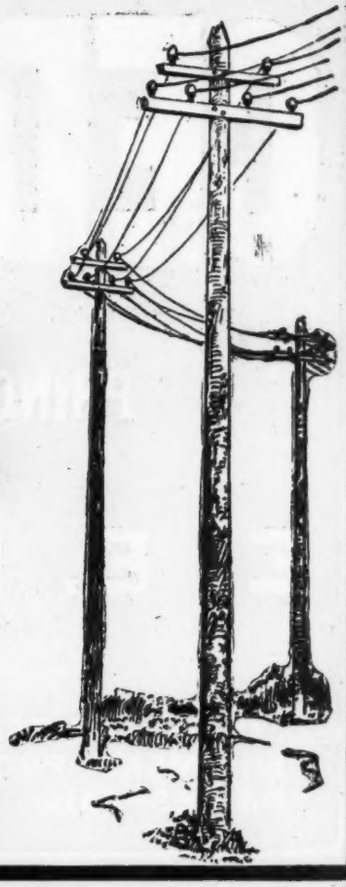
ESCANABA, MICHIGAN,

PRODUCERS AND WHOLESALERS

CEDAR POLES

FROM THE STUMP TO THE LINE.

WE ALWAYS CARRY A LARGE STOCK OF ALL SIZES OF WHITE CEDAR POLES, AND HAVING YARDS ON ALL PRINCIPAL RAILROADS IN NORTHERN MICHIGAN AND MINNESOTA, ARE IN POSITION TO MAKE IMMEDIATE SHIPMENT.



CEDAR POLES

YARDS IN MICHIGAN, WISCONSIN AND MINNESOTA.

IDAHO CEDAR POLES

LONG LENGTHS A SPECIALTY

WRITE FOR DELIVERED PRICES

CARNEY BROTHERS COMPANY

610 CHAMBER OF COMMERCE

CHICAGO, ILLINOIS

CEDAR POLES

PRINCIPAL YARDS { CHICAGO, ILL.
MENOMINEE, MICH.
CHEBOYGAN, MICH.
WEST SUPERIOR, WIS.

E. E. NAUGLE TIE CO.

159 LA SALLE STREET

POLES—THE BEST
SHIPMENT—PROMPT
PRICES—FAIR

CHICAGO, ILL.

WRITE FOR PRICES

MENTION TELEPHONY

Hall L. Brooks Co.

Hayman Block, TOMAHAWK, WISCONSIN

DEALER IN

WHITE CEDAR POLES

POSTS AND PILING.

MIXED CAR LOTS A SPECIALTY

Write for Delivered Prices.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

MICHIGAN
WHITE CEDAR POLES
IS BEST THAT GROWS

We carry all sizes from 20 to 60 feet. Write us. Will quote delivered prices by return mail.

PERRIZO & SONS, Daggett, Mich.

SAND POINT CEDAR COMPANY
SAND POINT, IDAHO

Producers of

LONG IDAHO CEDAR POLES

OUR MOTTO:
GOOD MATERIAL, PROMPT SHIPMENT.

WRITE FOR PRICES

Please tell the Advertiser you saw his Announcement in TELEPHONY.

PENDLETON & GILKEY

816-817 Lumber Exchange Bldg.,
MINNEAPOLIS, MINN.

PRODUCERS OF EVERYTHING IN CEDAR.

CEDAR POLES

All Sizes Large Stock Low Prices

Prompt Shipments

YARDS

MOUNTAIN, WIS, ANDERSON, WIS. BREED, WIS.
JANESVILLE, WIS. SURING, WIS. LAKEWOOD, WIS.

ESTABLISHED IN 1867

WRIGHT BROS.

MARINETTE, WISCONSIN.

Wholesale and Retail Dealers in All Qualities and Kinds of

CEDAR

WE MAKE A SPECIALTY OF

POLES, POSTS AND TIES

WE WILL NOT BE UNDERSOLD
WRITE FOR DELIVERED PRICES

MAIN YARDS: Marinette, Wis., Amberg, Wis., Kelso, Mich., Lathrop, Mich., Beecher Lake, Wis., DeKuester's Sidings, Wis., [on Dunbar and Wausaukee R. R.,] ***Pembine, Wis.***

Address all inquiries to ***WRIGHT BROS., MARINETTE, WISCONSIN.***

Please tell the Advertiser you saw his Announcement in TELEPHONY.

WOOD PRESERVING

POLES AND CROSS ARMS

TREATED WITH ANY OF OUR VARIOUS PROCESSES

SEND FOR BOOKLET AND PRICES

INTERNATIONAL CREOSOTING & CONSTRUCTION COMPANY

ADDRESS ALL COMMUNICATIONS TO

WORKS: Beaumont, Tex. / Texarkana, Tex. OFFICE: Galveston, Texas

Capacity Based on 24 Hours Treatment. 75,000,000 B. M. Feet Per Year.

WORM'S EYE VIEW

STOMBAUGH GUY ANCHORS

SAVE

TIME, LABOR, DIGGING AND

MONEY

THEY SCREW IN LIKE A CORKSCREW
USE THEM TO ANCHOR YOUR POLES RIGHT

W. N. MATTHEWS & BRO.
DISTRIBUTORS
505 Carleton Building, ST. LOUIS

KELLOGG SWITCHBOARD AND SUPPLY CO.

CHICAGO, ILL.

WHOLESALERS OF

MICHIGAN WHITE CEDAR

POLES

OF QUALITY

Five Yards Prompt Shipments

CHESTNUT

Best Quality **Prompt Shipment**

GREENBRIER POLE CO.

Principal Yards
Renick and Seebert, W. Va.

1022 Real Estate Trust Bldg.
Philadelphia, Pa.

WRITE FOR PRICES

All Sizes **POLES** **Any Quantities**

POLES

CHESTNUT — CEDAR — JUNIPER

ALL LENGTHS—ALL SIZES

PROMPT SHIPMENTS **WRITE FOR PRICES**

WESTERN ELECTRIC COMPANY

CHICAGO **NEW YORK**

SAINT LOUIS ⁘ **DENVER** ⁘ **KANSAS CITY** ⁘ **PITTSBURG** ⁘ **PHILADELPHIA**

SAN FRANCISCO (California Electric Works) **CINCINNATI** (Standard Electric Company) **SAINT PAUL** (American Electric Company)

Telephony Prints

more Cedar Pole Advertisements than all other publications in the world. If you deal in Cedar Poles and are not advertising in TELEPHONY let us give you ***TEN REASONS*** why you should.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

IDAHO
WISCONSIN
MICHIGAN

CEDAR POLES

John H. Fowler CEDAR POLES POSTS, SHINGLES & TIES CHICAGO

ELMORE-FOWLER-JACOBS Co. CEDAR POLES POSTS TIES SHINGLES

FOWLER-JACOBS COMPANY

YARDS IN IDAHO AND AT WASHBURN, PLUMMER, MELLEN AND VAN BUSKIRK, WIS.

JOHN H. FOWLER & CO. FOWLER-JACOBS CO.

ELMORE-FOWLER-JACOBS CO.

GENERAL OFFICE: 1705 Fisher Bldg., Chicago. BRANCH OFFICES: Washburn, Milwaukee and Van Buskirk, Wis.

CEDAR POLES

FRANCIS BEIDLER & COMPANY

CHICAGO, ILL.

POLE YARDS:

MENOMINEE, MICH.
ESCANABA, MICH.
SUPERIOR, WIS.
HERON, MONT.
CHICAGO, ILL.

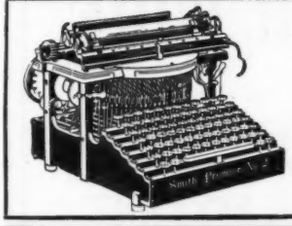
BARRY & BENTON

PRODUCERS AND WHOLESALERS OF

Idaho Cedar Poles

1300-2-4 OLD COLONY BUILDING, CHICAGO.

Yards: Hope and Sand Point, Idaho.



For practical work; for saving time; for long service and complete satisfaction, no other typewriter quite equals

The Smith Premier

A little book explaining just why this is so will be sent on request. Better ask about it to-day.

The Smith Premier Typewritter Co.

The Handy Electrical Dictionary

By W. L. WEBER, M. E.

Vest pocket form. Cloth, 25 cts. Morocco, 50 cts.

A book of ready reference, containing definitions of every used electrical term or phrase.

For Sale by The Telephony Publishing Co., Chicago, Ill.

POLES.

We make a Specialty of Michigan White Cedar.

Quality and Prompt Shipments are First Considerations.

Send in your orders. Sorting and Shipping Yards all through Michigan. Twenty-Five Years in the Pole Business.

W. C. STERLING & SON,

Main Office, MONROE, MICH.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

CLASSIFIED ADVERTISEMENTS

And want advertisements not exceeding twenty words exclusive of address, will be inserted in these columns for $1,00 each If over twenty words the rate will be 5 cents per word.

WILL EXCHANGE fine improved farm, 241 acres, for paying telephone plant. Value $12,500, or can divide. Address BOX 457, Oxford, Ohio.

THE ROBERT L. M'QUAT ELECTRICAL SUPPLY BUSINESS IS IN MY HANDS AS TRUSTEE FOR REORGANIZATION. It has been and is a successful business with 2,000 customers on the books. No business in the wholesale district has a surer and more promising future or can show better profits. The books are open for the most careful investigation. About $15,000 (payable on time if secured) will secure a controlling interest. It is a splendid opening for substantial investment. Alfred F. Potts, Trustee for Reorganization. Supply House, 125 So. Meridian St., Indianapolis, Ind.

FOR SALE—The Ottumwa Telephone Company's plant at Ottumwa, Iowa, including franchise and all its property. The company owns the three story brick building, built two years ago, in which is installed a Central Energy System, equipped for 1,540 full metallic lines, with selective ringing apparatus, all of the latest and the best. 1,250 telephones are installed, with 250 names on the waiting list. The company also owns 80 miles of toll lines. This is one of the best telephone phopositions in the state of Iowa. For full particulars, maps and photographs, address the CITIZENS' SAVING AND TRUST COMPANY, Cleveland, Ohio, or Henry S. Herr, Ottumwa, Iowa.

WANTED—Position as manager or superintendent of Independent telephone system. Many years' experience in telephone work. Best of references. Address 258, care TELEPHONY.

WANTED—Young man, preferably unmarried, who has a good general knowledge of telephone business, to accept position with telephone exchange and toll line company in Mexico. He will have a general supervision of the physical features of the business and will be held directly accountable to the company. Please state age, whether married or single, experience in detail, and salary wanted.

Telephone and Telegraph Wire

Made by continuous process from the best Rods obtainable. Possesses great Strength and high conductivity. Pliable, yet tough and uniform.

GUARANTEED STANDARD

Our Wire is known to the trade as, "Extra BB," "BB" and "Steel."

Your orders are earnestly solicited. Write for our quotations and Special Discounts.

Indiana Steel & Wire Co.
MUNCIE, INDIANA.

CYPRESS POLES.

I am shipping cypress poles to fifteen states. Did you ever try them?

Let me quote you prices delivered to your city. ***LEE J. TAYLOR, Campbell, Mo.***

ROEBLING

DOUBLE GALVANIZED TELEGRAPH WIRE

STEEL B.B E.B.B.

HARD DRAWN COPPER WIRE

GALVANIZED WIRE STRAND FOR POLE GUYS AND CABLE SUPPORT

MADE BY

JOHN A. ROEBLING'S SONS CO.

TRENTON, N. J.

Branch Offices and Warehouses: NEW YORK CHICAGO CLEVELAND SAN FRANCISCO

THE NATIONAL WIRE CORPORATION
QUALITY 8 EBB GUARANTEED
THE NATIONAL WIRE CORPORATION
QUALITY 12 BB GUARANTEED
THE NATIONAL WIRE CORPORATION
QUALITY 14 STEEL GUARANTEED

Look for the Tags

They are your protection against inferior quality

Our

Telephone and Telegraph Wires

are

Extra Double Galvanized

with the finest grade of pure zinc. Every bundle bears a tin tag and lead car seal, as shown in the photographs, and is

Guaranteed Standard Quality

THE NATIONAL WIRE CORPORATION

Works and General Offices: **NEW HAVEN, CONN.**

Sales Offices and Warehouses:

New York, Boston, Chicago, DeKalb, Kansas City, San Francisco

WIRE ROPE ∴ WIRE STRAND

Ask for Special Price Lists, with Tables.

What Better Proof Do You Want Than This

Of How to Cut Down the Maintenance Expense Account

Cedar Rapids, Iowa, Dec. 17, 1903.

THE NEW HAVEN NOVELTY MACHINE CO., New Haven, Conn.

Gentlemen: In answer to yours of the 15th inst., relative to the satisfaction given us by your Novelty Cable Sleeves, would say that we have about 275 Sleeves and Pot-Heads installed in our system. Have had them in use for nearly one year and have not had occasion at any time to repair any sleeve or pot-head from any defect caused by apparatus.

We have had several of your Sleeves immersed in water in manholes for several days at a time, but have had no moisture in our cables from that source. We consider them first-class in every respect; they have passed beyond the age of experiment and in our estimation are infinitely superior to the old-fashioned wiped sleeve.

Yours respectfully,
CEDAR RAPIDS & MARION TELEPHONE CO,
By (Signed) W. H. Durin, Secy. and Treas.

The contract for the total equipment of the Lincoln Telephone Company (Nebraska) was secured by the General Engineering Company of Chicago, Ill., who used between three and four hundred Novelty devices. Why?

1st. Because of their quality.

2d. Because they could and did save money by their use over the old fashioned lead pipe wiped joint. It was not a matter of sentiment, but of dollars and cents. For the same reason the Sioux City (Iowa) Telephone Company will use our devices exclusively. Between two and three hundred independent telephone companies are now using the Novelty devices because—

1st. They save money in installation.

2d. They give the power of inspection without further cost.

3d. Their own splicers do the whole work; hence independence. Independent companies should insist that their contractors should give them the best.

THE NEW HAVEN NOVELTY MACHINE CO., NEW HAVEN, CONN.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

None better

THE TESTIMONIALS we publish from month to month are not mere statements coming from anybody without any foundation or truth. They are the opinions of the best authority—good, solid true testimonials from men who understand the telephone and the telephone business.

What good we say about the Andrae Telephone is simply a repetition of what our customers say.

A. L. Parson & Brothers say:

Gentlemen:—
We have just put in 25 of your phones and have never had phones to work any better. They are the best boxes we have handled.

We deem it good policy for you to write to us if you are in the market for telephones or telephone supplies. It's an old reliable saying the "Andrae telephones never disappoint."

WRITE TO ANDRAE

Julius Andrae & Sons Company
217 West Water St.
MILWAUKEE, WIS.

BITUMINIZED FIBER CONDUIT

FOR ELECTRICAL UNDERGROUND CONSTRUCTION
ELECTROLYSIS PROOF & WATER PROOF

A smooth laminated insulator of unchanging durability.

Forms a continuous sealed duct from manhole to manhole, impervious to moisture and through which leaking gas cannot penetrate. There has never been a gas explosion in our conduits, nor the slightest evidence of electrolysis.

Abrasion of the cables is an impossibility.

It saves sixty per centum of freight and handling cost, and twenty to twenty-five per centum of construction.

Process of laying is simple, rapid and inexpensive. There is no loss from breakage or fitting.

It is self-aligning and cannot settle out of alignment.

All sizes, from one inch to ten inches interior diameter. Bends of all angles.

The foremost electrical engineers are recognizing and testifying to the scientific advantages of our system of subway construction over all previous methods.

Send for illustrated book. Ask for prices, giving size and quantities required.

PROMPT DELIVERIES

AMERICAN CONDUIT COMPANY
7TH FLOOR, 170 BROADWAY, NEW YORK
336 Macy St., Los Angeles, Cal. Manhattan Bldg., Chicago
Factories: PHILADELPHIA, CHICAGO, LOS ANGELES

Macomber & Whyte Co.

19 and 21 South Canal St. CHICAGO

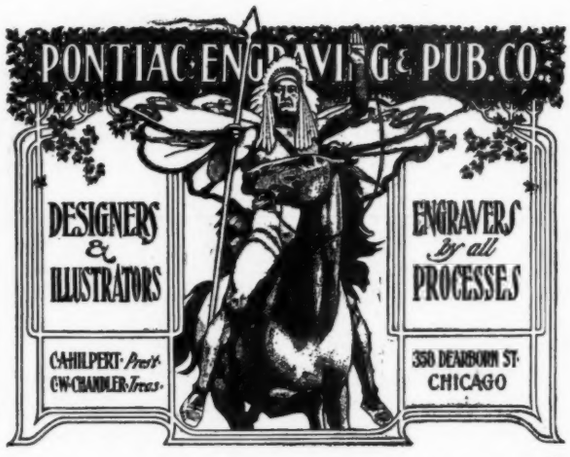
MANUFACTURERS OF

Telephone Construction Material, Galvanized Strand and Wire.

CABLE HANGERS—Any Style.

WRITE FOR SPECIAL CATALOG.

SPECIMENS OF TELEPHONES AND ELECTRICAL APPARATUS SENT ON REQUEST.



Submit us your copy and we will cheerfully quote prices and advise the best process suited the subject

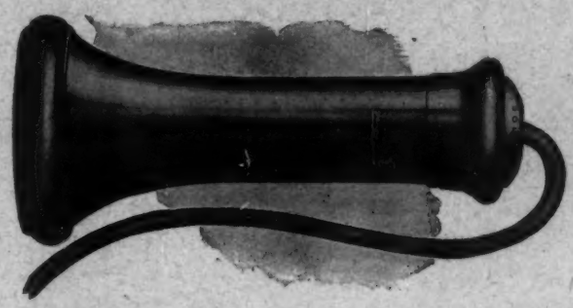
Please tell the Advertiser you saw his Announcement in TELEPHONY.

SHEET BRASS
ALL TEMPERS
BRASS DRILL ROD
German Silver, Brass and Copper **WIRE**
BRAZED and SEAMLESS TUBING

The Plume & Atwood Mfg. Co.
199 Lake Street, CHICAGO

TRADE **"SOLID"** MARK

OUR NEW



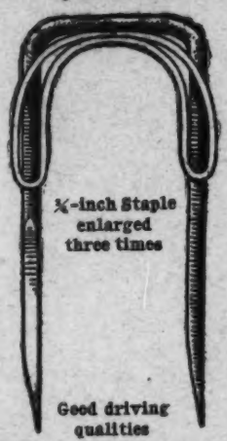
STYLE H

MURDOCK, :: :: Chelsea, Mass.

SQUARE HEAD

Double fibre insulation

Securely attached



¼-inch Staple enlarged three times

Good driving qualities

PAT. NOV. 27 1900

BLAKE INSULATED STAPLE

¼-inch Staple exact size

MADE IN TWO LENGTHS
For general use, 3-4 inch. For use in hard wood, 1-2 inch.

Manufactured and for sale by

Blake Signal & Mfg. Co. 246 Summer Street, Boston, Mass.

SELLING AGENTS: ELECTRIC GAS LIGHTING CO., Boston. SCHOEN, AUSTIN & CO., Atlanta. CRESCENT CO., Chicago. J. A. WHITNEY, Denver.

F. M. BERNARDIN, Prest. E. L. FOUTCH, Vice Prest. E. R. ROYER, Treas. J. M. STEPHEN, Sec'y.

B-R TRADE MARK

THE B-R ELECTRIC & TELEPHONE MFG. CO.

Successors to { THE KANSAS CITY TELEPHONE MFG. CO. and B-R ELECTRIC CO. : : :

Cor. Fifth & Delaware St. . KANSAS CITY, MO.

ELECTRICAL SUPPLIES

Manufacturers of

Telephones and Appliances

Our prices will command your attention.
Stock complete and shipments prompt.

WE ALWAYS SAVE YOU MONEY ON FREIGHT.
Send for September Catalog.

ESTABLISHED 1816

WATERBURY & CO.

Telephone Cables

FOR AERIAL AND UNDERGROUND SERVICE

Paper Insulated, Lead Incased Cables for Power and Lighting Circuits.

Telephone and Telegraph Cables for Overhead and Underground Service.

WIRE ROPE

MANILA, SISAL AND TRANSMISSION ROPE

GENERAL OFFICES: 69 South St., New York
FACTORIES: Brooklyn, New York

BRANCHES
PITTSBURGH CHICAGO ST. LOUIS

AMERICAN ELECTRIC TELEPHONE CO.

CHICAGO

AUTHORIZED CAPITAL THREE MILLION.

LARGEST MANUFACTURERS IN THE WORLD.

WRITE FOR CATALOGUES.

AMERICAN ELECTRICAL WORKS

OUR SPECIALTIES,

TELEPHONE WIRES AND CABLES

CHICAGO, 82 Lake St. PHILLIPSDALE, R. I. NEW YORK, 26 Cortlandt.

Telephone Engineers and Contractors

All Branches of Telephone Construction

Rebuilding of Small and Medium Sized Exchanges a Specialty. We put them on a Dividend Paying Basis.

Write for our plan.

Wheeler Electric Construction Company

Plymouth Building, F. H. WHEELER, Prop. CHICAGO

W. H. CRUMB & COMPANY

ENGINEERS—CONTRACTORS

Telephone Engineering and Construction

Meritorious Independent Telephone Enterprises Financed

TELEPHONE HARRISON 2543. 1263 Monadnock Building, CHICAGO

Telephone Material

Get my proposition before buying. I can save you money.

Geo. W. Conover

Purchasing and Forwarding Agent for INDEPENDENT Telephone Cos.

Suite 1112, 135 ADAMS STREET, CHICAGO, ILL.

J. F. BUTTERFIELD,

Electrical Engineer and Contractor

Complete Telephone Exchanges Built and Material Furnished.

Cable Construction and Underground Conduit Construction a Specialty.

Room 535, 113 Adams Street, - - - CHICAGO, ILL.

"ELECTRIC BRAND" SAL AMMONIAC

MANGANESE DIOXIDE

ZINC CHLORIDE

Has been an important factor in improving the results obtained in telephone and small electric batteries. These goods are in a condition absolutely free from Acid and metallic impurities, and **almost chemically pure.** We have the Electric brand made with a special view to supplying the requirements and obtaining the best results for this particular class of consumers. The Electric Brand is endorsed by several of the leading telephone licensees and may be obtained from the leading Electrical Supply Houses, or direct from us.

BRANCH HOUSES { Boston, Philadelphia, Chicago, Providence, Hamilton, Canada, Montreal,

A. KLIPSTEIN & COMPANY

22 Pearl Street, New York

LE ROY W. STANTON

CONSULTING TELEPHONE ENGINEER

Plans, Specifications, and Supervision of Installation of Complete Telephone Plants

SPECIAL REPORTS ON TELEPHONE PROPERTIES AND APPARATUS

411 Electrical Bldg., CLEVELAND, OHIO.

Benedict & Burnham Brass and Copper Co.

BRASS, COPPER & GERMAN SILVER

in Sheets, Rods, Wire and Tubes

A large stock carried at our Warehouse

211-213 Lake Street - - Chicago

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PUBLISHERS OF

The Inter-State Corporation Record

Containing All Forms and Blanks For Organizing a New Corporation.

Stock Certificates, Bonds, Corporate and Notarial Seals, Blank Books, Printing, Lithographing.

167 Dearborn Street, CHICAGO.

Telephone Stock Certificates

Chicago Insulated Wire Co.

Hard and Soft Drawn Copper Wire.
Double Galvanized Telephone Wire.
Bare and Insulated Wire.
Galvanized Strand Wire.

FACTORY: SYCAMORE, ILL. 154 Lake Street, CHICAGO

FIBRE CONDUIT COMPANY

WORKS & PRINCIPAL OFFICE ORANGEBURG, N. Y.

UNDERGROUND CONDUIT

RIGHT IN THEORY — RIGHT IN PRACTICE — RIGHT IN PRICE

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